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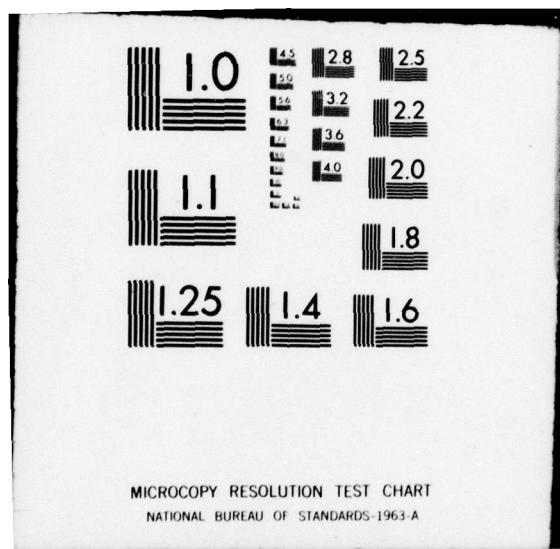
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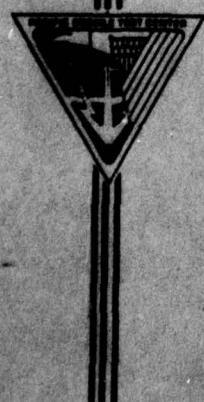
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TIDAL AND LUNAR DATA FOR
POINT MUGU, SAN NICOLAS ISLAND,
AND THE BARKING SANDS AREA
DURING 1979

5 February 1979

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED.

PACIFIC MISSILE TEST CENTER

Point Mugu, California 93042

DDC

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MAR 6 1979

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PACIFIC MISSILE TEST CENTER

AN ACTIVITY OF THE NAVAL AIR SYSTEMS COMMAND

This report was compiled by Mr. Robert de Violini with the assistance of Mrs. Barbara Williams.

Mr. J. S. Rosenthal, Head, Atmospheric Sciences Branch; Mr. D. A. Lea, Associate Geophysics Officer; Mr. T. C. Lockhart, Associate Range Operations Officer; and Mr. W. L. Miller, Associate Director, Range Directorate, have approved this report for publication.

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INTRODUCTION

This publication combines into a single source all tidal and lunar data for operational locations of the Pacific Missile Test Center for use in Calendar Year 1979.

The data presentations are in two main divisions: one for Point Mugu and San Nicolas Island, and the other for the Barking Sands area. Within each division, the times of moonrise and moonset and tidal data are given. An appendix provides information regarding lunar phases. Since all such data change from year to year, this publication will be reissued annually.

Sunrise-sunset times for these locations, and associated solar data which do not change significantly from year to year, are issued as a single, permanent publication. Further information regarding any of these data may be obtained from the Geophysics Division of the Range Operations Department.

DATA SOURCE AND TIME REFERENCES

The data given here have been prepared from information contained in Tide Tables for the West Coast of North and South America including the Hawaiian Islands, 1979.*

For Point Mugu and San Nicolas Island, all times listed are Pacific Standard Time (PST); add eight hours to obtain Greenwich Mean Time (GMT or Z).**

For the Barking Sands area, all times listed are Alaska-Hawaii Standard Time (AHST); add 10 hours to obtain GMT. Daylight Savings Time is not observed in Hawaii.

*National Ocean Survey, Tide Tables for the West Coast of North and South America Including the Hawaiian Islands, 1979. Washington, D.C., GPO, 1978.

**When Daylight Saving Time (PDT) is in effect, 1 hour is to be added to the times given. In 1979, Pacific Daylight Time is scheduled to commence at 0200 PST on Sunday, 29 April (add 1 hour), and to end at 0200 PDT on Sunday, 28 October (subtract 1 hour).

TIDAL DATA

The ranges of tidal heights that may be expected at Point Mugu and San Nicolas Island are shown in table 1. The range of heights for the primary harbor in the Barking Sands area, Port Allen, is shown in table 2. The times and heights of high and low tides for 1979 at Point Mugu are given in the even-numbered tables 4 through 26, and at San Nicolas Island in the odd-numbered tables 5 through 27. Similar tide data for Port Allen are given in tables 29 through 40.

Table 1. Tidal Ranges for Point Mugu and San Nicolas Island

Tidal Levels	Point Mugu	San Nicolas Island
	Height (Feet)	Height (Feet)
Extreme high water	7.3	6.7
Mean higher high water	5.3	4.9
Mean high water	4.5	4.1
Mean tide level*	2.7	2.5
Mean low water	0.9	0.8
Mean lower low water	0.0	0.0
Extreme low water	-2.0	-1.8

*The mean tide level is also called mean sea level.

Table 2. Tidal Ranges for Port Allen

Tidal Levels	Height (Feet)
Extreme high water	2.6
Mean higher high water	1.6
Mean high water	1.2
Mean tide level*	0.7
Mean low water	0.2
Mean lower low water	0.0
Extreme low water	-0.4

*The mean tide level is also called mean sea level.

Tidal graphs prepared from the Point Mugu data are presented in figures 1 through 12, and graphs prepared from the Port Allen tables are presented in figures 13 through 24. (Because of their close similarity to the Point Mugu graphs, graphical presentations of the San Nicolas Island data are not included in this publication.)

These tables list the times and heights of high and low tide for each month of the year and chronologically through each day. The heights are all measured from mean lower low water (see tables 1 and 2) and are values for a sea unaffected by wind waves or swell. The height and character of the sea surface are influenced by factors other than the predictable positions of the moon and sun, and is thus likely to be higher or lower than computed values may indicate.

LUNAR DATA

Times of moonrise and moonset for the Point Mugu-San Nicolas Island area in 1979 are given in table 3, and for the Barking Sands area in table 28, preceding the tidal data for the respective stations. Information regarding the phases of the moon in 1979 will be found in the appendix.

Table 3. Moonrise and Moonset, Point Mugu, California, 1979

Date	January		February		March		April		May		June		Date
	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	
1	0919	2042	0957	2245	0830	2132	0910	2314	0926	2334	1047	---	1
2	1003	2149	1035	2348	0910	2234	0956	---	1018	---	1140	0005	2
3	1043	2254	1114	---	0950	2334	1045	0007	1110	0016	1234	0037	3
4	1121	2356	1154	0047	1033	---	1136	0055	1203	0055	1329	0110	4
5	1158	---	1236	0144	1117	0031	1227	0139	1257	0131	1424	0142	5
6	1236	0057	1321	0238	1204	0124	1320	0219	1351	0205	1522	0216	6
7	1314	0156	1407	0330	1252	0214	1413	0257	1445	0238	1622	0252	7
8	1354	0254	1457	0418	1343	0300	1506	0332	1541	0310	1723	0333	8
9	1437	0349	1547	0502	1434	0342	1601	0405	1638	0344	1825	0417	9
10	1522	0443	1640	0543	1527	0421	1656	0438	1737	0419	1927	0508	10
11	1610	0533	1733	0621	1620	0458	1752	0512	1837	0458	2025	0604	11
12	1700	0620	1826	0657	1714	0532	1849	0546	1938	0540	2120	0705	12
13	1752	0704	1920	0731	1808	0605	1948	0622	2039	0626	2210	0810	13
14	1845	0744	2014	0804	1903	0638	2047	0701	2138	0718	2255	0917	14
15	1938	0821	2109	0836	1959	0711	2147	0744	2233	0816	2336	1023	15
16	2031	0856	2204	0909	2056	0746	2246	0832	2325	0917	---	1128	16
17	2125	0929	2301	0944	2154	0822	2343	0925	---	1020	0015	1233	17
18	2219	1001	---	1021	2253	0902	---	1022	0011	1125	0053	1336	18
19	2314	1034	0000	1103	2352	0946	0036	1123	0054	1230	0131	1438	19
20	---	1107	0100	1149	---	1035	0125	1227	0135	1335	0209	1539	20
21	0011	1144	0200	1241	0050	1129	0211	1333	0213	1439	0250	1638	21
22	0110	1223	0259	1339	0146	1229	0254	1439	0251	1543	0333	1736	22
23	0211	1308	0356	1443	0240	1333	0334	1545	0330	1646	0419	1831	23
24	0313	1358	0450	1551	0329	1439	0414	1651	0410	1748	0508	1921	24
25	0416	1456	0540	1701	0415	1547	0453	1756	0452	1848	0559	2008	25
26	0517	1600	0626	1811	0459	1656	0534	1900	0537	1945	0651	2050	26
27	0614	1708	0709	1920	0540	1804	0616	2002	0625	2038	0745	2129	27
28	0706	1818	0750	2027	0621	1910	0700	2101	0715	2128	0838	2205	28
29	0754	1928	---	---	0701	2015	0746	2156	0807	2212	0931	2238	29
30	0838	2037	---	---	0742	2118	0835	2247	0900	2253	1025	2310	30
31	0918	2143	---	---	0825	2218	---	---	0954	2330	---	---	31
Date	July		August		September		October		November		December		Date
	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	
1	1118	2342	1252	---	1435	0015	1502	0103	1547	0316	1544	0420	1
2	1213	---	1350	0002	1531	0112	1548	0210	1627	0423	1628	0524	2
3	1308	0014	1451	0045	1624	0215	1632	0318	1708	0531	1715	0627	3
4	1406	0049	1551	0134	1713	0322	1714	0428	1752	0638	1805	0727	4
5	1506	0126	1650	0229	1759	0432	1755	0537	1838	0742	1858	0823	5
6	1607	0208	1747	0331	1842	0543	1836	0646	1927	0844	1953	0913	6
7	1709	0255	1839	0438	1924	0653	1919	0754	2018	0942	2047	0959	7
8	1810	0348	1926	0547	2005	0802	2003	0859	2111	1034	2142	1039	8
9	1908	0448	2010	0658	2046	0909	2050	1001	2205	1121	2236	1116	9
10	2002	0653	2052	0807	2128	1014	2139	1100	2259	1204	2330	1150	10
11	2050	0701	2131	0915	2212	1116	2230	1153	2353	1242	---	1222	11
12	2135	0809	2211	1021	2258	1214	2322	1242	---	1317	0023	1253	12
13	2216	0917	2251	1125	2347	1309	---	1326	0046	1350	0117	1325	13
14	2255	1024	2332	1226	---	1400	0015	1406	0140	1422	0211	1358	14
15	2333	1129	---	1325	0037	1446	0108	1443	0233	1453	0307	1433	15
16	---	1232	0016	1421	0129	1528	0202	1517	0328	1526	0405	1511	16
17	0011	1333	0102	1514	0222	1606	0255	1549	0423	1600	0504	1554	17
18	0051	1433	0151	1602	0315	1642	0348	1621	0520	1637	0604	1643	18
19	0132	1530	0241	1647	0408	1716	0442	1653	0619	1717	0703	1737	19
20	0217	1625	0333	1728	0501	1748	0537	1726	0718	1802	0800	1837	20
21	0304	1717	0426	1806	0555	1820	0633	1801	0816	1852	0853	1940	21
22	0353	1805	0520	1841	0649	1852	0730	1839	0913	1947	0942	2045	22
23	0445	1848	0613	1914	0743	1925	0827	1920	1007	2047	1027	2151	23
24	0538	1928	0706	1946	0838	2000	0925	2006	1057	2149	1108	2257	24
25	0631	2005	0759	2017	0935	2039	1022	2057	1143	2254	1147	---	25
26	0725	2039	0853	2050	1032	2121	1117	2153	1226	2358	1225	0002	26
27	0818	2112	0948	2123	1129	2209	1209	2253	1306	---	1303	0106	27
28	0911	2143	1043	2200	1226	2302	1258	2356	1345	0104	1342	0210	28
29	1005	2215	1140	2240	1321	---	1343	---	1423	0209	1423	0313	29
30	1059	2248	1238	2325	1413	0000	1426	0102	1503	0314	1508	0415	30
31	1154	2323	1337	---	---	---	1507	0208	---	---	1556	0615	31

TABLE 4
POINT MUGU TIDES
34 DEG 06 MIN N. 119 DEG 06 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0431	1.8	1029	6.2	1741	-1.1	0441	1.6
2	0014	4.4	0532	1.9	1122	5.5	0021	2
3	0108	4.5	0648	2.0	1223	4.7	0115	3
4	0211	4.6	0816	1.9	1341	4.0	0218	4
5	0313	4.9	0950	1.6	1516	3.5	0320	5
6	0412	5.1	1113	1.1	1654	3.0	0419	6
7	0507	5.4	1218	0.5	1810	3.3	0514	7
8	0551	5.6	1307	0.0	1914	3.5	0558	8
9	0015	1.9	0630	5.8	1348	-0.3	0025	9
10	0055	1.9	0709	5.9	1424	-0.5	0105	10
11	0133	2.0	0741	5.9	1456	-0.6	0143	11
12	0208	2.0	0813	5.9	1525	-0.7	0218	12
13	0240	2.0	0841	5.8	1556	-0.6	0250	13
14	0313	2.0	0913	5.7	1625	-0.5	0323	14
15	0348	2.0	0945	5.4	1654	-0.3	0358	15
16	0424	2.1	1013	5.1	1724	0.0	0434	16
17	0503	2.2	1049	4.6	1755	0.4	0513	17
18	0033	3.9	0556	2.3	1127	4.1	1827	18
19	0115	3.9	0706	2.4	1216	3.8	0040	19
20	0205	4.1	0840	2.2	1333	3.0	0122	20
21	0301	4.3	1017	1.8	1535	2.8	0308	21
22	0356	4.7	1126	1.1	1721	2.9	0403	22
23	0452	5.1	1220	0.4	1829	3.2	0519	23
24	0539	5.6	1305	-0.3	1920	3.5	0546	24
25	0014	1.9	0630	6.1	1345	-1.0	0024	25
26	0104	1.6	0715	6.5	1427	-1.4	0114	26
27	0153	1.4	0801	6.8	1509	-1.6	0203	27
28	0242	1.2	0846	6.8	1549	-1.6	0252	28
29	0332	1.1	0931	6.5	1631	-1.4	0342	29
30	0424	1.0	1021	6.0	1713	-0.9	0434	30
31	0521	1.1	1112	5.3	1756	-0.3	0531	31

TABLE 5
JANUARY 1979
SAN NICOLAS ISLAND TIDES
33 DEG 16 MIN N. 119 DEG 30 MIN W - CENTRAL PART NE COAST

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	1	0.44	1	0.6	1036	5.7	1751	-1.0
2	2	0.021	2	4.1	0542	1.7	1129	5.4
3	3	0115	3	4.2	0658	1.8	1230	4.4
4	4	0218	4	4.3	0826	1.7	1348	3.7
5	5	0320	5	4.6	1000	1.5	1523	3.3
6	6	0419	6	4.7	1123	1.0	1701	3.1
7	7	0514	7	5.0	1228	0.5	1823	3.1
8	8	0558	8	5.2	1317	0.0	1922	3.3
9	9	0025	9	1.7	0637	5.4	1358	-0.3
10	10	0105	10	1.7	0716	5.5	1436	-0.5
11	11	0143	11	1.8	0748	5.5	1506	-0.5
12	12	0218	12	1.8	0820	5.5	1535	-0.6
13	13	0250	13	1.8	0848	5.4	1606	-0.5
14	14	0323	14	1.8	0920	5.3	1635	-0.5
15	15	0358	15	1.8	0952	5.0	1704	-0.3
16	16	1.020	16	1.9	1020	4.7	1734	0.0
17	17	1.056	17	2.0	1056	4.3	1805	0.4
18	18	1.0606	18	2.0	1134	3.8	1837	0.7
19	19	1.0716	19	2.0	1223	3.4	1916	1.0
20	20	1.0850	20	2.0	1340	2.8	2010	1.4
21	21	1.0927	21	2.0	1027	1.6	1542	2.6
22	22	1.1136	22	4.4	1136	1.0	1728	2.7
23	23	1.1230	23	4.7	1230	0.4	1836	3.0
24	24	1.1315	24	5.2	1315	-0.3	1927	3.3
25	25	1.0637	25	1.7	0637	5.6	1355	-0.9
26	26	1.0722	26	1.5	0722	6.0	1437	-1.3
27	27	1.0808	27	1.3	0808	6.3	1519	-1.5
28	28	1.0853	28	1.1	0853	6.3	1559	-1.5
29	29	1.0938	29	0.9	0938	6.0	1641	-1.3
30	30	1.01028	30	0.9	1028	5.6	1723	-0.8
31	31	1.0531	31	1.0	1119	4.9	1806	-0.3

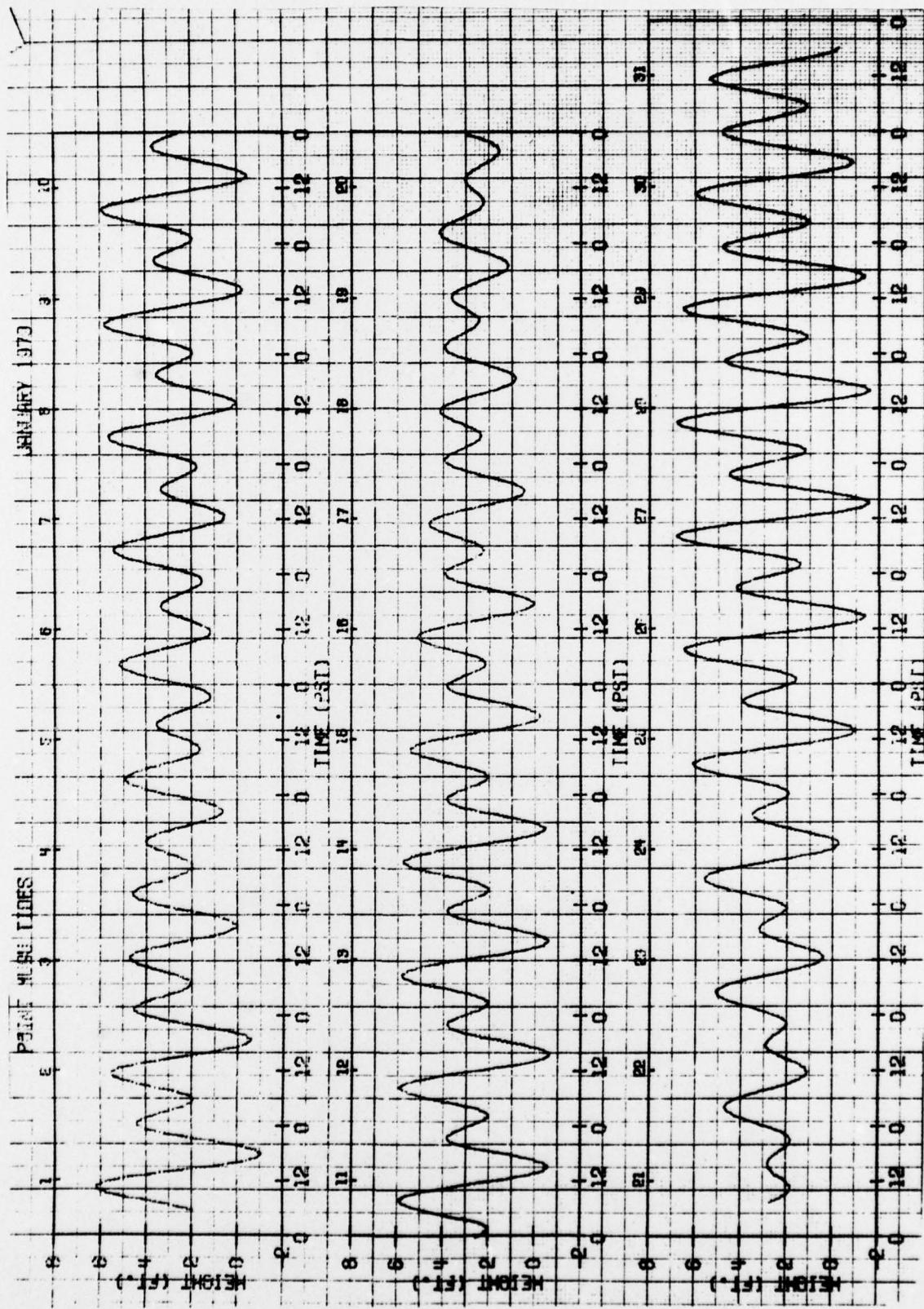


Figure 1. Tidal Graph for Point Mugu, January 1979.

TABLE 6
POINT MUGU TIDES
34 DEG 06 MIN N. 119 DEG 06 MIN W - OCEAN PIER

DATE	TIME	HGT	TIME	HGT	TIME	HGT	TIME	HGT	TIME	HGT
	PSI	FT	PST	FT	PST	FT	PST	FT	PST	FT
1	0020	4.8	0625	1.3	1209	4.5	1841	0.3		
2	0113	4.8	0744	1.3	1321	3.7	1933	1.0	0027	4.5
3	0217	4.8	0917	1.3	1458	3.1	2035	1.6	0120	4.5
4	0323	4.8	1050	0.9	1654	3.0	2151	2.0	0224	4.5
5	0430	4.9	1200	0.5	1821	3.2	2307	2.1	0330	4.5
6	0526	5.1	1252	0.1	1914	3.4	0006	2.1*	0437	4.6
7	0613	5.3	1333	-0.2	1956	3.6	---	---	0533	4.7
8	0050	2.0	0653	5.4	1408	-0.4	2028	3.8	0620	4.9
9	0129	1.9	0729	5.5	1436	-0.5	2055	3.9	0700	5.0
10	0201	1.7	0801	5.6	1504	-0.5	2118	4.0	0736	5.1
11	0233	1.6	0832	5.6	1529	-0.5	2140	4.1	0808	5.2
12	0304	1.5	0901	5.5	1554	-0.3	2205	4.1	0243	1.5
13	0336	1.4	0930	5.2	1619	-0.1	2232	4.2	0314	1.4
14	0410	1.4	1002	4.9	1644	0.2	2301	4.1	0346	1.3
15	0446	1.5	1037	4.5	1711	0.5	2330	4.2	0420	1.3
16	0532	1.5	1112	4.0	1741	0.9	---	---	0456	1.4
17	0002	4.2	0625	1.6	1202	3.4	1810	1.4	1044	2.2
18	0049	4.3	0741	1.6	1313	2.9	1849	1.6	1119	3.9
19	0145	4.3	0921	1.4	1519	2.6	1955	2.1	0144	2.3
20	0259	4.5	1050	0.8	1717	2.8	2137	2.3	0206	4.2
21	0412	4.8	1152	0.2	1821	3.2	2301	2.2	0419	4.5
22	0519	5.3	1244	-0.4	1907	3.7	0007	1.8*	1202	0.2
23	0614	5.8	1324	-1.0	1942	4.1	---	---	0621	5.4
24	0101	1.4	0704	0.2	1406	-1.3	2021	4.5	0111	1.3
25	0150	0.9	0752	6.4	1445	-1.4	2056	4.8	0200	0.8
26	0236	0.5	0837	6.4	1524	-1.3	2134	5.1	0246	0.5
27	0325	0.3	0926	6.1	1603	-0.9	2213	5.2	0335	0.3
28	0414	0.2	1013	5.6	1642	-0.4	2252	5.2	0424	0.2

TABLE 7
SAN NICOLAS ISLAND TIDES
33 DEG 16 MIN N. 119 DEG 30 MIN W - CENTRAL PART NE COAST

DATE	TIME	HGT	TIME	HGT	TIME	HGT	TIME	HGT	TIME	HGT
	PSI	FT	PST	FT	PST	FT	PST	FT	PST	FT
1			0027	4.5	0635	1.2	1216	4.2	1651	0.3
2			0120	4.5	0754	1.2	1328	3.5	1943	0.9
3			0224	4.5	0927	1.2	1505	2.9	2045	1.5
4			0330	4.5	1100	0.8	1701	2.8	2201	1.8
5			0437	4.6	1210	0.5	1828	3.0	2317	1.9
6			0533	4.7	1302	0.1	1921	3.2	0016	1.9*
7			0620	4.9	1343	-0.2	2003	3.4	---	---
8			0700	5.0	1418	-0.4	2035	3.5	2102	3.6
9			0736	5.1	1446	-0.5	2125	3.7	2125	3.7
10			0808	5.2	1514	-0.5	2147	3.8	2147	3.8
11			0839	5.2	1539	-0.5	2212	3.8	2212	3.8
12			0908	5.1	1660	-0.3	2239	3.9	2239	3.9
13			0937	4.8	1629	-0.1	2308	3.8	2308	3.8
14			1009	4.6	1654	0.2	2337	3.2	2337	3.2
15			1044	4.2	1721	0.5	2357	3.2	2357	3.2
16			1119	3.7	1751	0.8	2377	3.2	2377	3.2
17			1149	3.7	1751	0.8	2400	3.2	2400	3.2
18			1209	3.2	1820	1.3	2420	3.2	2420	1.3
19			1250	2.7	1859	1.6	2459	3.2	2459	1.6
20			1320	2.7	1959	1.6	2505	1.9	2505	1.9
21			1350	2.7	2005	2.5	2525	2.1	2525	2.1
22			1424	2.7	2044	2.6	2544	2.1	2544	2.1
23			1454	2.7	2100	2.6	2574	2.1	2574	2.1
24			1524	2.7	2120	2.6	2604	2.1	2604	2.1
25			1554	2.7	2140	2.6	2634	2.1	2634	2.1
26			1624	2.7	2160	2.6	2664	2.1	2664	2.1
27			1654	2.7	2180	2.6	2694	2.1	2694	2.1
28			1724	2.7	2200	2.6	2724	2.1	2724	2.1

* -- TIDE OCCURS ON NEXT DATE.

* -- TIDE OCCURS ON NEXT DATE.

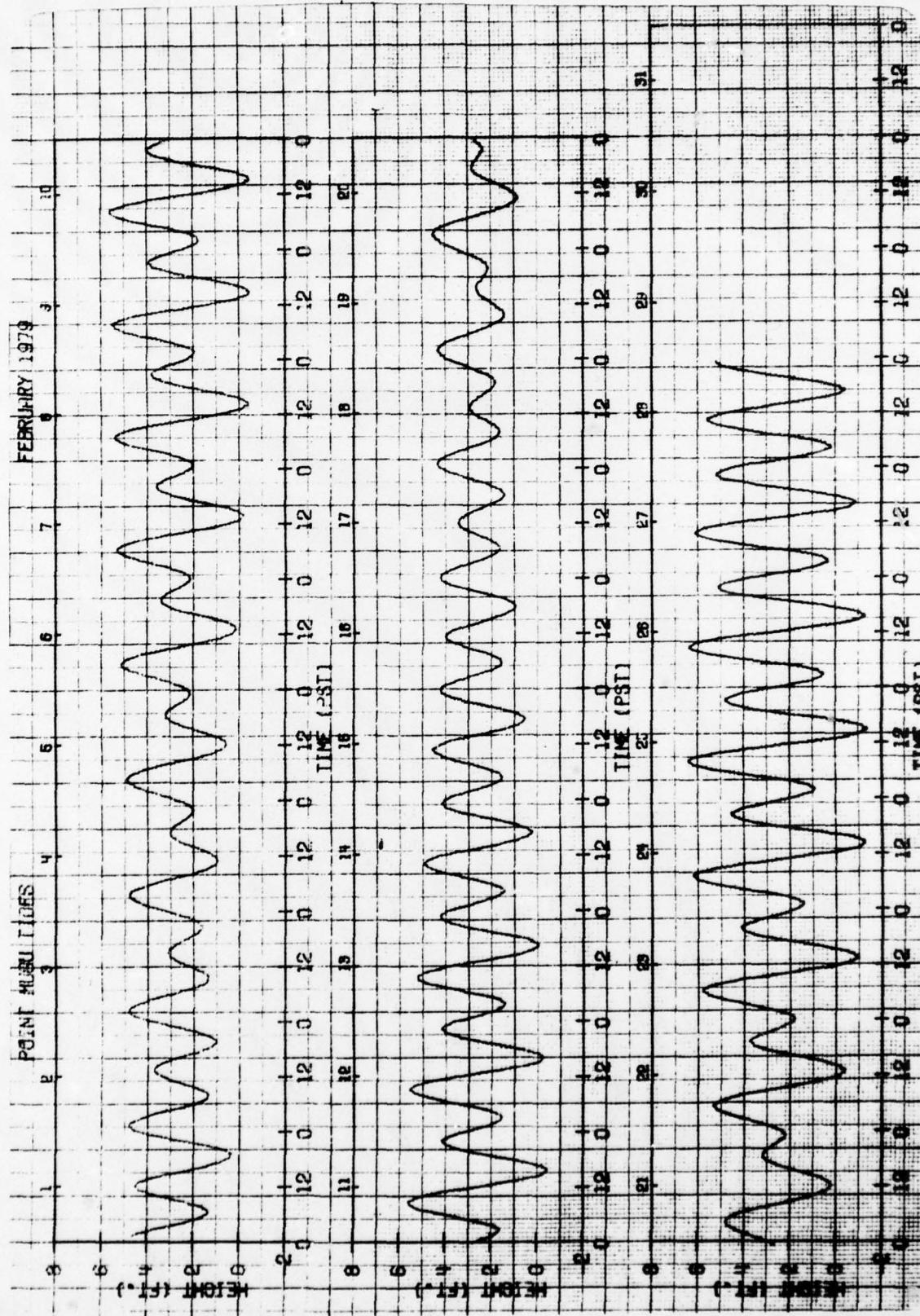


Figure 2. Tidal Graph for Point Mugu, February 1979.

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TABLE 8
POINT MUGU TIDES
34 DEG 06 MIN N 119 DEG 06 MIN W - OCEAN PIER

DATE	TIME PST	MGT FT	TIME PST	MGT FT	TIME PST	MGT FT	TIME PST	MGT FT
1	0504	4.3	1101	4.9	1718	0.2	2333	5.1
2	0603	0.5	1157	4.1	1758	0.9	---	---
3	0018	4.9	0709	0.7	1307	3.4	1846	1.5
4	0116	4.6	0835	0.9	1444	2.9	1949	2.1
5	0225	4.4	1011	0.8	1650	2.9	2122	2.4
6	0345	4.4	1130	0.5	1813	3.2	2256	2.4
7	0459	4.5	1223	0.2	1900	3.5	2359	2.2
8	0552	4.7	1305	0.0	1930	3.7	---	8
9	0044	1.9	0638	4.9	1337	-0.1	1955	3.9
10	0119	4.6	0713	5.0	1406	-0.2	2017	4.1
11	0151	1.3	0746	5.1	1430	-0.2	2039	4.3
12	0220	1.1	0817	5.1	1454	-0.1	2101	4.4
13	0252	0.9	0847	5.0	1518	0.0	2123	4.3
14	0321	0.7	0918	4.9	1543	0.2	2147	4.0
15	0357	0.6	0951	4.6	1607	0.5	2213	4.7
16	0434	0.6	1027	4.2	1634	0.8	2241	4.7
17	0514	0.7	1110	3.7	1659	1.2	2314	4.0
18	0606	0.8	1202	3.3	1729	1.7	2357	4.5
19	0712	0.8	1323	2.9	1809	2.1	---	19
20	0050	4.4	0845	0.8	1529	2.8	1935	2.4
21	0214	4.4	1014	0.4	1707	3.1	2132	2.5
22	0344	4.6	1122	0.0	1801	3.5	2301	2.1
23	0500	4.9	1213	-0.4	1820	4.0	0006	1.6*
24	0600	5.3	1256	-0.7	1916	4.5	---	24
25	0058	1.0	0654	5.6	1337	-0.9	1951	4.9
26	0146	0.4	0743	5.7	1416	-0.8	2024	5.3
27	0222	-0.1	0632	5.6	1453	-0.6	2059	5.5
28	0315	-0.4	0917	5.3	1530	-0.5	2134	5.6
29	0443	-0.5	1003	4.9	1605	0.3	2211	5.6
30	0449	-0.4	1053	4.3	1642	0.8	2250	5.3
31	0540	-0.1	1149	3.8	1719	1.4	2329	5.0

* -- TIDE OCCURS ON NEXT DATE.

* -- TIDE OCCURS ON NEXT DATE.

TABLE 9
SAN NICOLAS ISLAND TIDES
33 DEG 16 MIN N 119 DEG 30 MIN W - CENTRAL PART NE COAST

DATE	TIME PST	MGT FT	TIME PST	MGT FT	TIME PST	MGT FT	TIME PST	MGT FT
1	0514	0.3	1108	4.6	1728	0.2	2340	4.7
2	0613	0.5	1204	3.8	1808	0.8	---	---
3	0025	4.6	0719	0.6	1314	3.2	1856	1.4
4	0123	4.3	0845	0.8	1451	2.7	1959	1.9
5	0232	4.1	1021	0.7	1657	2.7	2132	2.2
6	0352	4.1	1140	0.5	1820	3.0	2306	2.2
7	0506	4.2	1233	0.2	1907	3.3	0009	2.0*
8	0559	4.4	1315	0.0	1937	3.5	---	---
9	0645	4.6	1347	-0.1	2002	3.6	2016	0.2
10	0129	1.5	0720	4.6	1416	0.2	2024	3.8
11	0201	1.2	0753	4.7	1440	-0.2	2046	4.0
12	0301	1.0	0824	4.7	1504	-0.1	2108	4.1
13	0302	0.8	0925	4.6	1528	0.0	2130	4.2
14	0331	0.6	0925	4.6	1553	0.2	2154	4.3
15	0407	0.5	0958	4.3	1617	0.5	2220	4.4
16	0444	0.5	1034	3.9	1644	0.7	2248	4.4
17	0522	0.6	1117	3.5	1709	1.1	2321	4.3
18	0610	0.7	1209	3.1	1739	1.5	0004	4.2*
19	0722	0.7	1330	2.7	1819	1.9	---	---
20	0857	4.1	0855	0.7	1536	2.6	1945	2.2
21	0221	4.1	1024	0.4	1714	2.9	2142	2.3
22	0351	4.3	1132	0.0	1808	3.3	2311	1.9
23	0507	4.6	1223	-0.4	1627	3.7	0016	1.5*
24	0607	4.9	1306	-0.6	1923	4.2	---	---
25	0108	0.9	0701	5.2	1347	0.8	1958	4.6
26	0156	0.4	0750	5.3	1426	-0.7	2031	4.9
27	0242	-0.1	0839	5.2	1503	-0.5	2106	5.1
28	0325	-0.4	0924	4.9	1540	-0.2	2141	5.2
29	0413	-0.5	1010	4.6	1615	0.3	2218	5.2
30	0459	-0.4	1100	4.0	1652	0.7	2257	4.9
31	0550	-0.1	1156	3.5	1729	1.3	2336	4.6

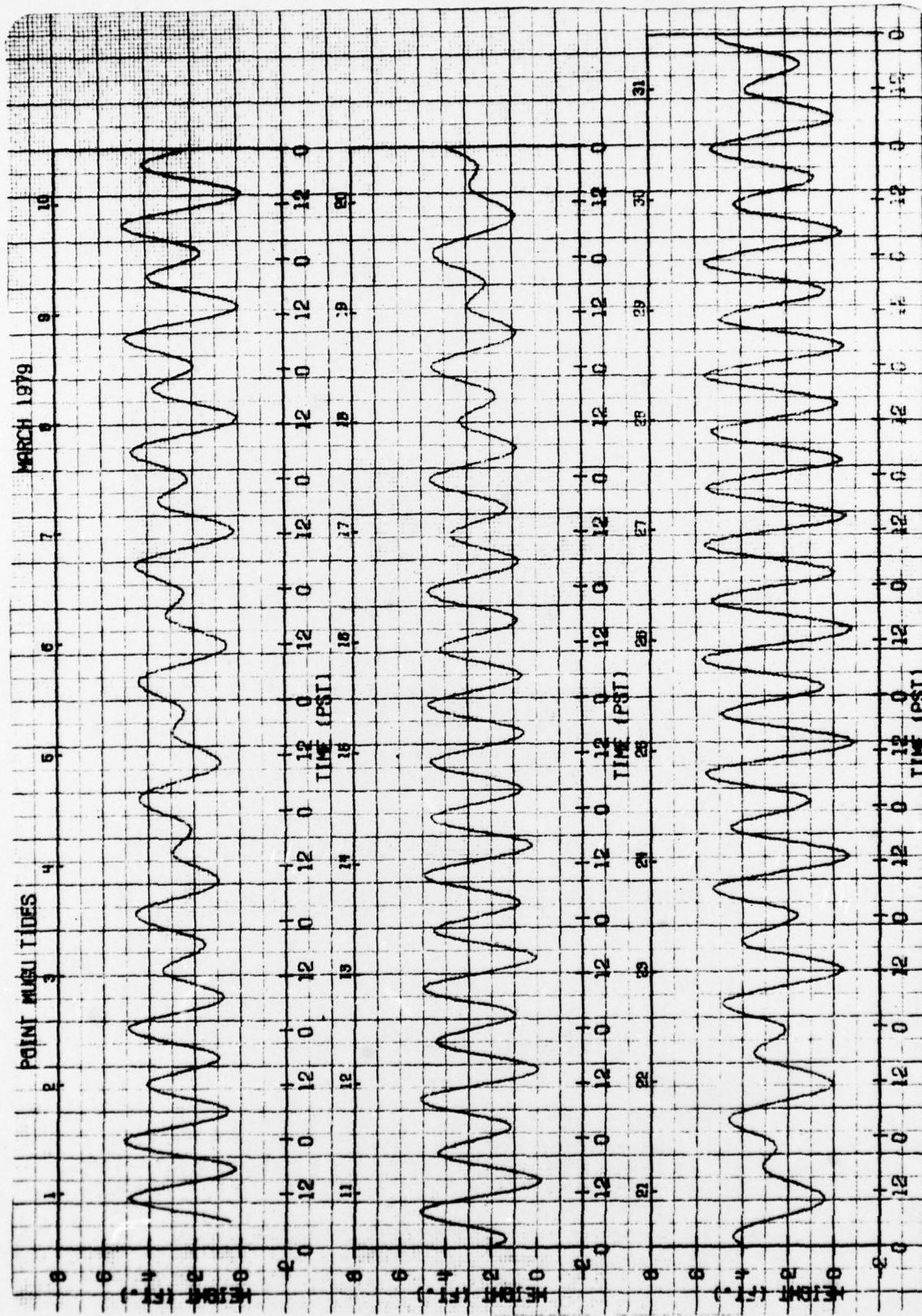


Figure 3. Tidal Graph for Point Mugu, March 1979.

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TABLE 1
SAN NICOLAS ISLAND TIDES
APRIL 1979

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0650	0.2	1306	3.1	1811	1.8	1914	2.2
2	0025	4.3	0003	0.5	1445	2.0	2104	2.5
3	0126	3.9	0928	0.5	1638	2.9	2250	2.3
4	0255	3.6	1047	0.5	1751	3.1	2356	2.0
5	0421	3.6	1146	0.4	1830	3.4	---	---
6	0527	3.8	1220	0.3	1855	3.6	---	---
7	0038	1.6	0616	4.0	1302	0.2	1919	3.8
8	0115	1.3	0555	4.1	1321	0.2	1942	4.1
9	0144	0.9	0133	4.2	1359	0.2	2003	4.5
10	0216	0.5	0806	4.3	1424	0.3	2025	4.5
11	0247	0.3	0841	4.2	1449	0.5	2049	4.6
12	0319	0.1	0916	4.1	1514	0.6	2114	4.7
13	0355	-0.1	0953	3.8	1540	0.9	2141	4.8
14	0433	-0.2	1034	3.6	1609	1.2	2213	4.8
15	0515	-0.1	1124	3.4	1641	1.5	2247	4.7
16	0608	0.0	1227	3.0	1711	4.6	2332	4.6
17	0710	0.1	1352	2.8	1816	2.2	---	---
18	0033	4.3	0826	0.1	1536	3.0	1952	2.4
19	0153	4.1	0946	0.1	1645	3.3	2151	2.3
20	0329	4.0	1053	-0.1	1736	3.7	2311	1.7
21	0448	4.2	1146	-0.1	1816	4.2	0015	1.1*
22	0557	4.4	1231	-0.3	1850	4.6	---	---
23	0103	0.5	0653	4.5	1315	-0.2	1925	5.0
24	0150	-0.1	0745	4.6	1354	0.0	2000	5.3
25	0224	-0.5	0842	4.5	1432	0.2	2033	5.5
26	0319	-0.7	0919	4.3	1504	0.5	2108	5.4
27	0401	-0.8	1007	3.9	1543	0.9	2142	5.1
28	0446	-0.7	1057	3.6	1618	1.4	2216	5.1
29	0529	-0.5	1150	3.3	1653	1.7	2255	4.7
30	0624	-0.2	1257	3.1	1736	4.4	2337	2.1

TABLE 10
POINT MUGU TIDES
24 DECEMBER 1978
APRIL 1979

DATE	TIME	MGT	PST	TIME	MGT	PST	TIME	MGT	PST	TIME	MGT	PST
		FT			FT			FT			FT	
1	0640	0-2	1259	3-3	1801	2-0	---	---	---	---	2-4	
2	0018	4-6	0753	0-5	1438	3-0	1904	2-6	2054	2-6	2-6	
3	0119	4-2	0918	0-6	1631	2-1	2240	2-5	2240	2-5	2-5	
4	0248	3-9	1037	0-6	1744	3-4	2346	2-2	2346	2-2	2-2	
5	0414	3-9	1136	0-4	1823	3-6	---	---	---	---	---	
6	0520	4-1	1220	0-3	1848	3-9	---	---	---	---	---	
7	0028	1-8	0609	4-3	1252	0-2	1912	4-1	1935	4-4	4-4	
8	0105	1-4	0648	4-4	1321	0-2	1956	4-0	1956	4-0	4-0	
9	0134	1-0	0726	4-5	1349	0-2	2018	4-8	2018	4-8	4-8	
10	0206	0-6	0759	4-0	1414	0-3	2042	5-0	2042	5-0	5-0	
11	0237	0-3	0834	4-5	1439	0-7	2107	5-1	2107	5-1	5-1	
12	0309	0-1	0909	4-4	1504	0-7	2134	5-2	2134	5-2	5-2	
13	0345	-0-1	0946	4-1	1530	1-0	2206	5-2	2206	5-2	5-2	
14	0423	-0-2	1027	3-9	1559	1-3	2240	5-1	2240	5-1	5-1	
15	0505	-0-1	1117	3-5	1631	1-6	2325	4-9	2325	4-9	4-9	
16	0558	0-0	1220	3-2	1707	4-9	---	---	---	---	---	
17	0700	0-1	1305	3-0	1806	2-4	1942	2-5	1942	2-5	2-5	
18	0026	4-6	0816	0-1	1529	3-2	2141	2-5	2141	2-5	2-5	
19	0146	4-4	0926	0-1	1638	3-5	2301	1-9	2301	1-9	1-9	
20	0322	4-3	1043	-0-1	1729	4-0	0005	1-2*	0005	1-2*	1-2*	
21	0441	4-5	1126	-0-2	1809	4-5	1843	5-0	1843	5-0	5-0	
22	0550	4-7	1221	-0-3	1843	5-0	1918	5-4	1918	5-4	5-4	
23	0053	0-5	0646	4-8	1305	-0-2	1953	5-7	1953	5-7	5-7	
24	0140	-0-1	0738	4-9	1344	0-0	2026	5-9	2026	5-9	5-9	
25	0224	0-6	0825	4-8	1422	0-2	2101	5-4	2101	5-4	5-4	
26	0309	-0-8	0912	4-6	1454	0-6	2135	5-8	2135	5-8	5-8	
27	0351	-0-9	1000	4-2	1533	1-0	2211	5-1	2211	5-1	5-1	
28	0436	-0-8	1050	3-9	1608	1-5	2248	5-1	2248	5-1	5-1	
29	0519	-0-5	1143	3-5	1643	1-9	2330	4-7	2330	4-7	4-7	
30	0614	-0-2	1250	3-3	1726	2-3						

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

* -- TIME OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

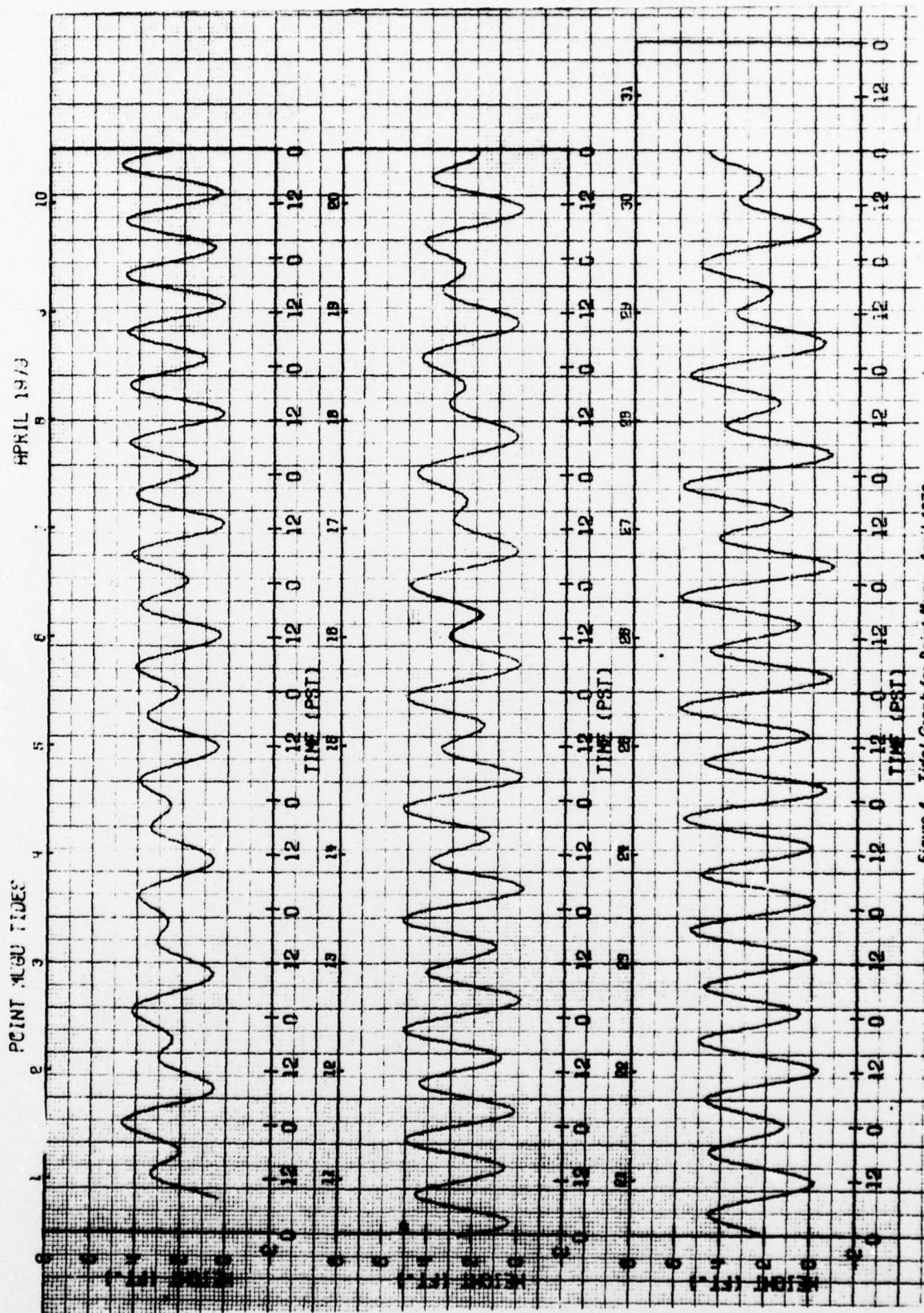


Figure 4. Tidal Graph for Point Mugu, April 1979.

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TABLE 12
POINT MUGU TIDES
34° 06' 06 MIN N. 119 DEG 06 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0710	0.1	1418	3.2	1825	2.6	----	----
2	0023	4.2	0918	0.4	1546	3.3	2011	2.5
3	0135	3.8	0930	0.6	1651	3.5	2203	2.6
4	0308	3.6	1030	0.6	1730	3.8	2317	2.3
5	0428	3.6	1117	0.6	1759	4.1	0003	1.88
6	0528	3.6	1156	0.7	1824	4.4	----	----
7	0042	1.3	0619	3.8	1228	0.7	1845	4.7
8	0114	0.8	0701	3.9	1911	5.0	0124	5.0
9	0146	0.3	0743	4.0	1328	0.9	1938	5.3
10	0222	-0.1	0821	4.0	1358	1.0	2003	5.5
11	0257	-0.4	0902	4.0	1426	1.2	2032	5.7
12	0333	-0.7	0944	3.9	1500	1.4	2102	5.8
13	0415	-0.6	1032	3.7	1536	1.7	2142	5.7
14	0500	-0.8	1125	3.6	1615	2.0	2223	5.5
15	0549	-0.7	1228	3.5	1703	2.3	2312	5.2
16	0648	-0.5	1344	3.5	1819	2.5	----	----
17	0012	4.8	0752	-0.3	1456	4.1	1955	2.5
18	0131	4.4	0855	-0.1	1559	4.1	2137	2.2
19	0300	4.1	1001	0.0	1651	4.5	2258	1.6
20	0426	4.0	1058	0.2	1732	5.0	2355	0.9
21	0539	4.1	1147	0.4	1811	5.4	----	----
22	0052	0.2	0640	4.1	1231	0.6	1849	5.8
23	0137	-0.3	0733	4.1	1311	0.8	1923	6.0
24	0219	-0.7	0825	4.1	1350	1.1	1958	6.1
25	0301	-0.9	0911	4.0	1425	1.4	2033	6.1
26	0341	-1.0	0957	3.9	1501	1.7	2109	5.9
27	0421	-0.9	1044	3.7	1539	2.0	2141	5.6
28	0503	-0.7	1132	3.6	1615	2.2	2217	5.3
29	0545	-0.4	1231	3.5	1700	2.5	2255	4.9
30	0632	-0.1	1334	3.4	1755	2.7	2340	4.4
31	0723	0.3	1439	3.5	1915	2.3	----	----

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

TABLE 13
SAN NICOLAS ISLAND TIDES
33° 07' 16 MIN N. 119 DEG 30 MIN W - CENTRAL PART NE COAST

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0720	0.1	1425	3.0	1835	2.5	----	----
2	0010	3.9	0910	3.5	1042	3.5	0940	0.5
3	0115	3.4	1035	4.0	1127	0.5	1040	0.5
4	0235	3.4	1127	0.5	1206	0.6	1127	0.5
5	0355	3.5	1206	0.6	1331	4.1	1206	0.6
6	0535	3.5	1331	4.1	0626	3.5	1331	4.1
7	0655	1.2	0708	0.7	0708	3.6	1310	0.7
8	0815	0.3	0750	3.7	0828	3.7	1338	0.8
9	0935	0.1	0809	3.7	0909	3.7	1408	0.9
10	1055	0.1	0909	3.7	1030	-0.4	1436	1.1
11	1215	0.1	1030	-0.4	1030	1.2	1510	1.3
12	1335	-0.6	1043	-0.6	1043	-0.6	1510	1.3
13	1455	-0.7	1045	-0.7	1039	3.5	1546	1.5
14	1615	-0.7	1132	3.4	1132	3.4	1625	1.8
15	1735	-0.6	1235	3.3	1235	3.3	1713	2.1
16	1855	-0.5	1351	3.3	1351	3.3	1829	2.3
17	2015	1.7	0802	-0.3	0802	-0.3	1503	3.5
18	2135	1.8	0909	0.1	0909	0.1	1606	3.8
19	2255	1.9	0307	3.8	0307	3.8	1658	4.2
20	2355	2.0	0433	3.7	1108	0.2	1739	4.6
21	0546	3.8	1108	0.2	0546	3.8	1818	5.0
22	0647	3.8	0647	3.8	0647	3.8	1241	5.5
23	0749	-0.3	0749	3.8	0749	3.8	1321	0.7
24	0829	-0.6	0832	3.8	0832	3.8	1400	1.0
25	0911	-0.8	0918	3.7	0918	3.7	1435	1.3
26	0951	-0.9	1004	3.6	1004	3.6	1511	1.5
27	1051	-0.8	1051	3.5	1051	3.5	1549	1.8
28	1139	-0.6	1139	3.4	1139	3.4	1625	2.0
29	1255	-0.4	1258	3.3	1258	3.3	1710	2.3
30	1342	-0.1	1342	3.2	1342	3.2	1805	2.5
31	1446	0.3	1446	3.3	1446	3.3	1925	2.6

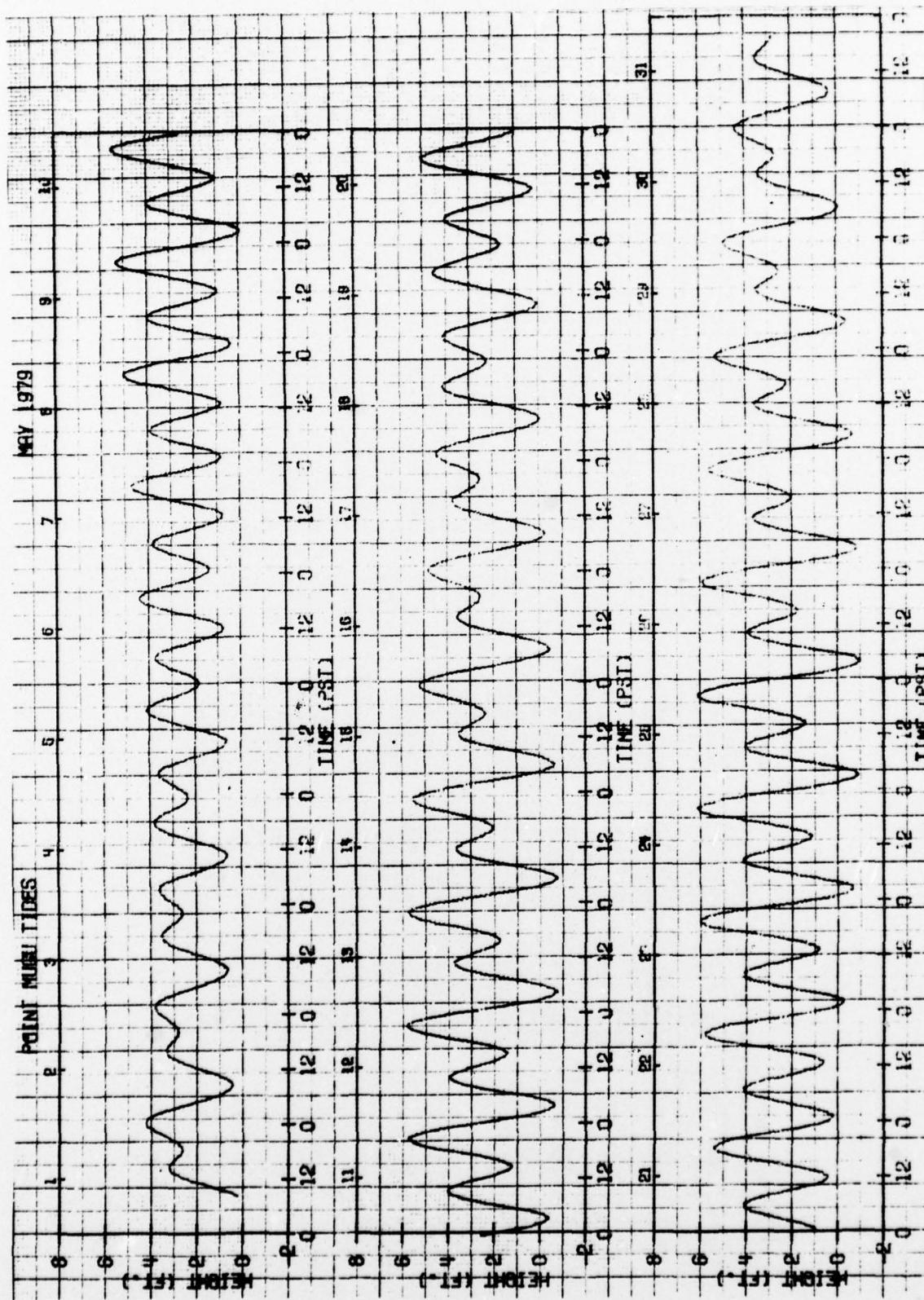


Figure 5. Tidal Graph for Point Mugu, May 1979.

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TABLE 14
POINT MAMU TIDES
34 DEG 06 MIN NO 119 DEG 06 MIN W - OCEAN PIER

DATE	TIME PST	NET FT	TIME NET PST	TIME MGT FT	TIME MGT PST
1	0633	3.9	0818	0.6	1535
2	0148	3.5	0912	0.8	1622
3	0221	3.3	1004	1.0	1659
4	0441	3.2	1050	1.1	1731
5	0614	1.3	0544	3.3	1130
6	0953	0.9	0638	3.4	1207
7	0128	0.2	0725	3.6	1242
8	0206	-0.3	0810	3.7	1319
9	0242	-0.7	0854	3.8	1356
10	0321	-1.0	0939	3.9	1436
11	0403	-1.2	1027	3.9	1521
12	0448	-1.2	1117	3.9	1609
13	0537	-1.0	1215	4.0	1691
14	0639	-0.8	1315	4.1	1821
15	0602	5.0	0724	-0.4	1414
16	0118	4.4	0823	0.0	1516
17	0244	3.9	0920	0.4	1610
18	0414	3.7	1020	0.6	1659
19	0534	3.6	1112	1.1	1744
20	0646	0.1	0643	3.6	1200
21	0136	-0.3	0739	3.7	1246
22	0216	-0.6	0826	3.8	1328
23	0255	-0.8	0911	3.8	1406
24	0330	-0.8	0953	3.8	1442
25	0406	-0.7	1032	3.8	1520
26	0441	-0.6	1112	3.8	1559
27	0516	-0.3	1154	3.7	1638
28	0555	0.0	1238	3.7	1727
29	0633	0.3	1323	3.8	1827
30	0712	0.7	1414	3.9	1948

ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

TABLE 15
SAN NICOLAS ISLAND TIDES
33 DEG 16 MIN N 119 DEG 30 MIN W - CENTRAL PART NE COAST

DATE	TIME PST	TIME NET FT	TIME PST	TIME MGT FT	TIME PST
1			0040	3.6	0828
2			0155	3.3	0922
3			0329	3.1	1014
4			0448	3.0	1100
5			0024	1.2	0551
6			0103	0.7	0645
7			0138	0.2	0732
8			0216	-0.3	0817
9			0252	-0.6	0901
10			0331	-0.9	0946
11			0413	-1.1	1034
12			0458	-1.1	1124
13			0547	-0.9	1222
14			0640	-0.7	1322
15			0009	4.6	0734
16			0125	4.1	0833
17			0251	3.6	0930
18			0421	3.5	1030
19			0541	3.4	1122
20			0056	0.1	0650
21			0146	-0.5	0746
22			0226	-0.5	0835
23			0305	-0.7	0918
24			0430	-0.7	1000
25			0416	-0.6	1039
26			0451	-0.5	1119
27			0526	-0.3	1201
28			0605	0.0	1245
29			0633	0.3	1330
30			0722	0.6	1421

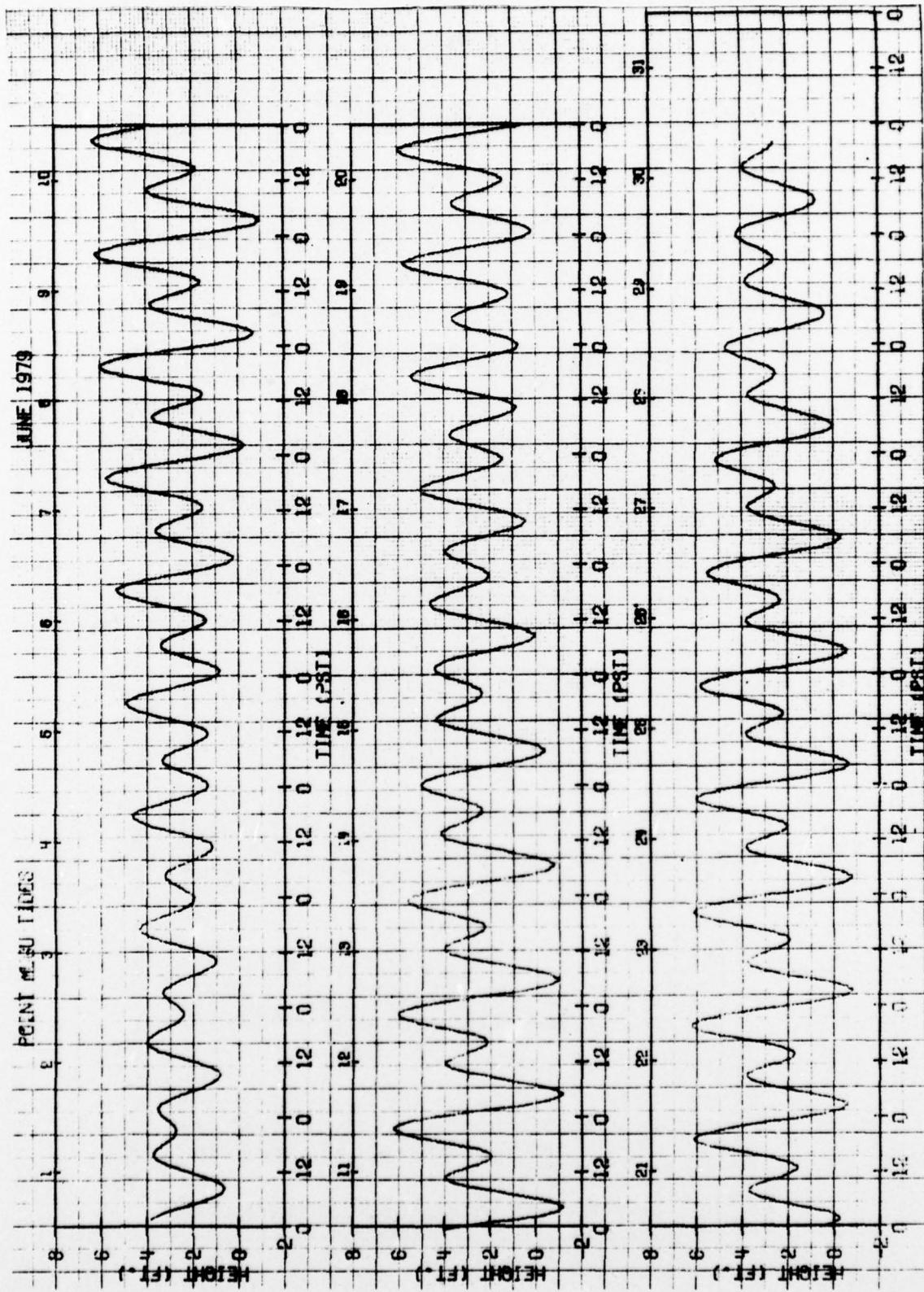


Figure 6. Tidal Graph for Point Mugu, June 1979.

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TABLE 16
POINT MUGU TIDES
34 DEG 06 MIN N, 119 DEG 06 MIN W - OCEAN PIER
JULY 1974

DATE	TIME PST	MGT FT	TIME MGT FT	TIME PST	MGT FT								
1	0049	3.7	0756	1.0	1504	4.1	2119	2.5	1	0056	3.5	0806	0.9
2	0205	3.3	0644	1.4	1550	4.4	2243	2.0	2	0212	3.1	0854	1.3
3	0346	3.0	0933	1.6	1632	4.7	2342	1.5	3	0353	2.8	0943	1.5
4	0515	3.0	1029	1.8	1710	5.1	---	---	4	0522	2.8	1039	1.6
5	0027	0.8	0621	3.2	1118	1.9	1747	5.5	5	0037	0.7	0628	3.0
6	0109	0.2	0714	3.4	1205	1.9	1829	5.9	6	0119	0.2	0721	3.2
7	0148	-0.4	0759	3.7	1252	1.9	1907	6.3	7	0158	-0.4	0806	3.5
8	0226	-0.8	0842	3.9	1337	1.8	1949	6.6	8	0236	-0.7	0849	3.6
9	0307	-1.2	0926	4.1	1426	1.8	2033	6.7	9	0317	-1.1	0933	3.8
10	0349	-1.3	1008	4.3	1515	1.8	2120	6.6	10	0359	-1.2	1015	4.0
11	0431	-1.3	1055	4.4	1607	1.8	2206	6.3	11	0441	-1.2	1102	4.1
12	0516	-1.0	1143	4.5	1703	1.8	2258	5.8	12	0526	-0.9	1150	4.2
13	0603	-0.6	1234	4.7	1811	1.9	2357	5.1	13	0613	-0.5	1241	4.4
14	0651	-0.1	1331	4.8	1930	1.9	---	---	14	0701	-0.1	1338	4.5
15	0106	4.4	0742	0.5	1427	5.0	2100	1.6	15	0113	4.1	0752	0.5
16	0232	3.8	0842	1.1	1529	5.2	2229	1.2	16	0239	3.5	0852	1.0
17	0409	3.4	0945	1.5	1627	5.5	2341	0.7	17	0416	3.2	0995	1.4
18	0539	3.4	1046	1.8	1718	5.7	---	---	18	0546	3.2	1056	1.6
19	0037	0.2	0653	3.5	1146	2.0	1806	5.9	19	0047	0.2	0700	3.3
20	0126	-0.4	0741	3.7	1234	2.1	1847	6.0	20	0136	-0.2	0748	3.5
21	0205	-0.4	0825	3.8	1319	2.1	1924	6.1	21	0215	-0.4	0832	3.5
22	0342	-0.5	0902	3.9	1355	2.1	2000	6.1	22	0252	-0.5	0909	3.6
23	0314	-0.5	0936	4.0	1431	2.1	2032	6.0	23	0324	-0.5	0941	3.7
24	0343	-0.4	1003	4.1	1503	2.1	2104	5.8	24	0353	-0.4	1010	3.8
25	0415	-0.3	1034	4.1	1541	2.1	2136	5.6	25	0425	-0.3	1041	3.8
26	0444	-0.1	1103	4.1	1617	2.2	2211	5.3	26	0454	-0.1	1110	3.6
27	0513	0.2	1138	4.1	1700	2.3	2244	4.8	27	0523	0.2	1145	3.8
28	0542	0.6	1214	4.2	1748	2.3	2322	4.3	28	0552	0.5	1221	3.9
29	0614	1.0	1252	4.2	1848	2.4	---	---	29	0624	0.9	1259	3.9
30	0610	3.8	0649	1.4	1337	4.3	2010	2.3	30	0617	3.5	0659	1.3
31	0119	3.3	0726	1.8	1433	4.5	2147	2.0	31	0126	3.1	0736	1.6

ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

* -- TIDE OCCURS ON NEXT DATE.

ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

TABLE 17
SAN NICOLAS ISLAND TIDES
33 DEG 16 MIN N, 119 DEG 30 MIN W - CENTRAL PART OF COAST
JULY 1979

DATE	TIME PST	MGT FT	TIME MGT FT	TIME PST	MGT FT								
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
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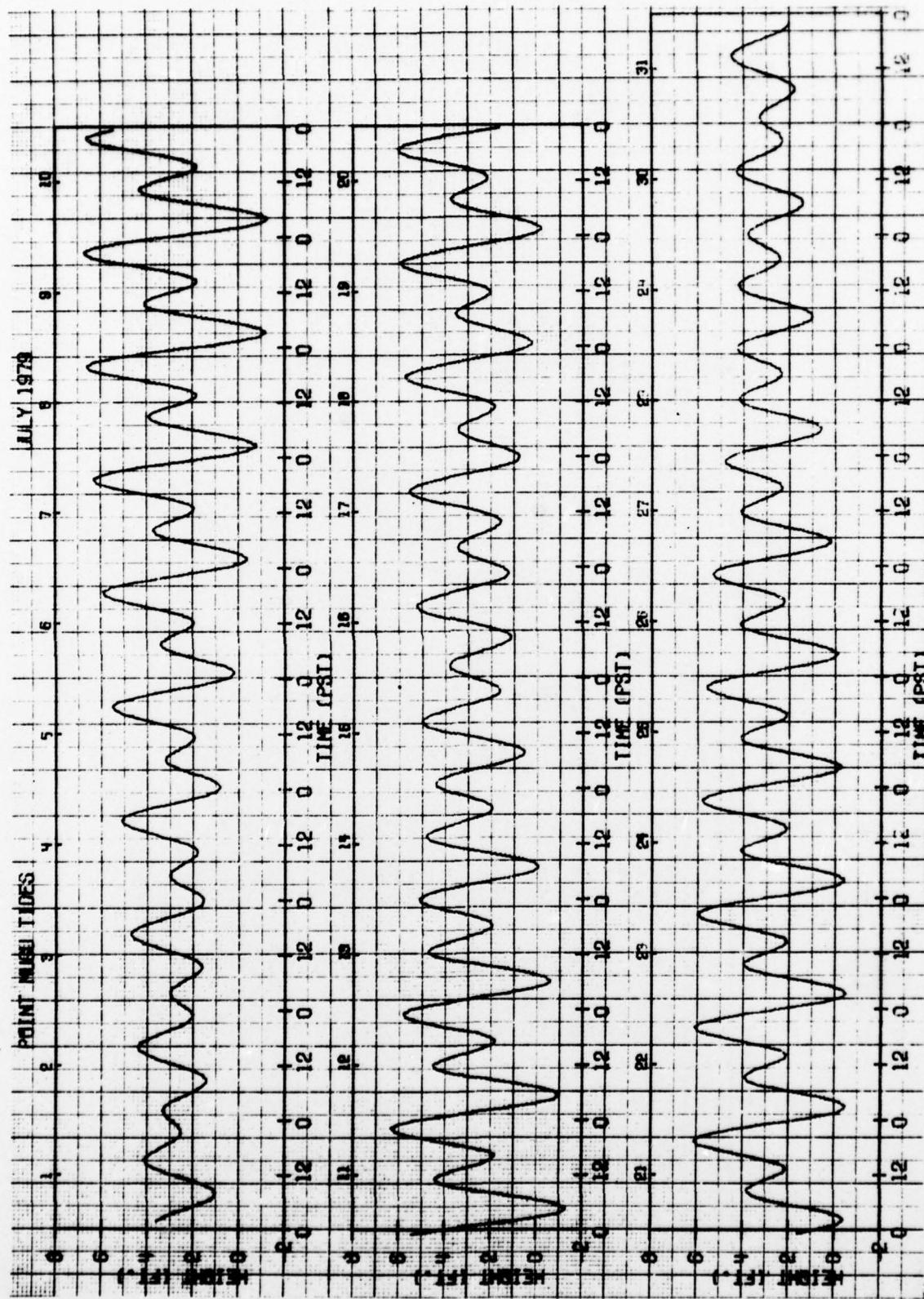


Figure 7. Tidal Graph for Point Mugu, July 1979.

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TABLE 18
POINT MUGU TIDES
34 DEG 06 MIN N 119 DEG 06 MIN W - OCEAN PIER

DATE	TIME PST	MGT FT	TIME PST	MGT FT	TIME PST	MGT FT	TIME PST	MGT FT
1	0305	3.0	0824	2.1	1527	4.7	2302	1.5
2	0451	3.0	0936	2.3	1625	5.1	2358	0.9
3	0610	3.3	1045	2.4	1715	5.5	----	----
4	0644	0.2	0701	3.6	1148	2.2	1806	6.0
5	0125	-0.3	0743	3.9	1240	2.0	1851	6.4
6	0206	-0.9	0823	4.3	1330	1.7	1937	6.7
7	0246	-1.1	0900	4.6	1418	1.5	2023	6.9
8	0325	-1.2	0939	4.8	1508	1.3	2109	6.7
9	0407	-1.0	1019	5.0	1558	1.2	2157	6.3
10	0447	-0.6	1104	5.2	1654	1.2	2249	5.7
11	0529	-0.1	1149	5.2	1756	1.2	2346	5.0
12	0614	0.5	1239	5.2	1908	1.3	----	----
13	0504	4.2	0706	1.2	1339	5.2	2034	1.3
14	0223	3.6	0805	1.8	1446	5.2	2208	1.1
15	0412	3.4	0918	2.2	1554	5.3	2323	0.7
16	0544	3.5	1037	2.4	1659	5.4	----	----
17	0023	0.3	0647	3.8	1141	2.4	1752	5.6
18	0108	0.1	0733	4.0	1234	2.3	1837	5.7
19	0146	-0.1	0805	4.1	1316	2.1	1914	5.8
20	0218	-0.1	0833	4.3	1346	2.0	1946	5.8
21	0249	-0.1	0901	4.4	1420	1.8	2019	5.8
22	0314	0.0	0923	4.5	1452	1.7	2051	5.7
23	0338	0.1	0949	4.5	1524	1.7	2120	5.5
24	0406	0.3	1013	4.6	1559	1.6	2152	5.2
25	0428	0.6	1039	4.6	1636	1.7	2227	4.8
26	0456	1.0	1110	4.6	1718	1.7	2303	4.3
27	0522	1.4	1141	4.6	1809	1.8	2349	3.8
28	0553	1.8	1220	4.6	1918	1.9	----	----
29	0057	3.3	0625	2.2	1316	4.6	2051	1.7
30	0252	3.0	0724	2.5	1424	4.7	2219	1.3
31	0454	3.2	0906	2.7	1543	4.9	2325	0.8

ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

* -- TIDE OCCURS ON NEAR DATE.

ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

TABLE 19
SAN NICOLAS ISLAND TIDES
33 DEG 16 MIN N 119 DEG 30 MIN W - CENTRAL PART NE COAST

DATE	TIME PST	MGT FT	TIME PST	MGT FT	TIME PST	MGT FT	TIME PST	MGT FT
1	0312	2.6	0834	1.9	1534	4.4	2312	1.4
2	0458	2.8	0946	2.1	1632	4.7	0808	0.8*
3	0617	3.1	1055	2.2	1722	5.1	----	----
4	0554	0.2	0708	3.4	1158	2.0	1813	5.6
5	0135	-0.3	0750	3.6	1250	1.8	1858	5.9
6	0216	-0.7	0830	4.9	1340	1.5	1944	6.2
7	0256	-1.0	0907	4.3	1428	1.4	2030	6.4
8	0335	-1.1	0946	4.5	1518	1.2	2116	6.2
9	0417	-0.9	1026	4.6	1608	1.1	2204	5.8
10	0457	-0.5	1111	4.8	1704	1.1	2256	5.3
11	0539	-0.1	1156	4.8	1806	1.1	2353	4.6
12	0624	0.5	1246	4.8	1918	1.2	----	----
13	0716	1.1	0716	3.9	1346	4.8	2044	1.2
14	0230	3.4	0815	1.6	1453	4.8	2218	1.0
15	0419	3.2	0928	2.0	1601	4.9	2333	0.6
16	0551	3.3	1047	2.2	1706	5.0	----	----
17	0654	3.5	1151	2.2	1759	5.2	----	----
18	0740	3.7	1244	2.1	1844	5.3	----	----
19	0812	3.8	0840	4.0	1326	1.9	1921	5.4
20	0228	-0.1	0908	4.1	1358	1.8	1953	5.4
21	0324	-0.1	0930	4.2	1430	1.6	2026	5.4
22	0346	0.0	0956	4.2	1502	1.5	2058	5.3
23	0348	0.1	1056	4.2	1534	1.5	2127	5.1
24	0416	0.3	1020	4.3	1609	1.5	2159	4.8
25	0438	0.5	1046	4.3	1646	1.5	2234	4.5
26	0506	0.9	1117	4.3	1728	1.5	2310	4.0
27	0532	1.3	1148	4.3	1819	1.6	2356	3.5
28	0603	1.6	1227	4.3	1928	1.7	----	----
29	0635	2.0	1323	4.3	1323	4.3	2101	1.5
30	0259	2.8	0734	2.4	1431	4.4	2229	1.2
31	0501	3.0	0914	2.5	1550	4.6	2335	0.7

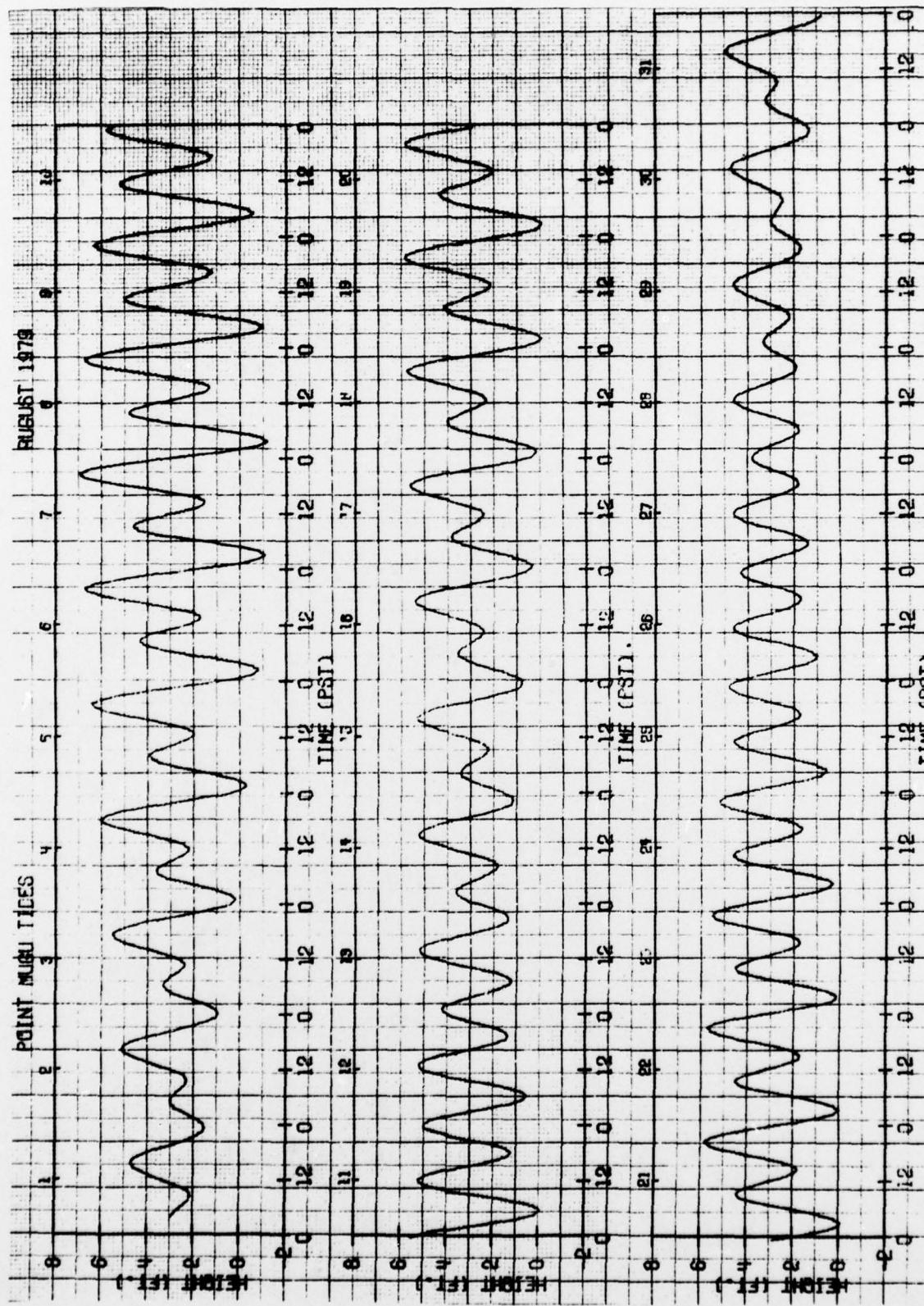


Figure 8. Tidal Graph for Point Mugu, August 1979.

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TABLE 20
POINT MUGU TIDES
34 Deg 06 Min N, 119 Deg 06 Min W - OCEAN PIER

DATE	TIME PST	MGT FT	TIME PST	MGT FT	TIME PST	MGT FT	TIME PST	MGT FT
1	0558	3.5	1033	2.6	1652	3.4	---	---
2	0015	0.2	0640	3.9	1142	2.5	1745	5.6
3	0100	-0.3	0717	4.4	1236	1.2	1837	6.3
4	0140	-0.6	0751	4.8	1323	1.4	1925	6.5
5	0218	-0.8	0826	5.2	1412	0.9	2014	6.6
6	0257	-0.7	0905	5.5	1500	0.6	2100	6.4
7	0336	-0.5	0942	5.7	1548	0.4	2150	6.0
8	0414	0.0	1022	5.8	1641	0.4	2240	5.4
9	0453	0.6	1104	5.7	1737	0.5	2338	4.7
10	0532	1.2	1151	5.5	1842	0.8	---	---
11	0047	4.0	0625	1.9	1247	5.2	2002	0.9
12	0220	3.5	0726	2.4	1353	5.0	2134	0.9
13	0417	3.5	0902	2.7	1514	4.8	2254	0.7
14	0540	3.8	1035	2.7	1630	4.9	2354	0.5
15	0632	4.0	1143	2.5	1731	5.1	---	---
16	0040	0.3	0707	4.3	1821	5.2	2129	1.0
17	0115	0.2	0724	4.5	1308	1.9	1458	5.3
18	0147	0.2	0157	4.6	1338	1.7	1932	5.4
19	0212	0.3	0819	4.8	1410	1.4	2004	5.4
20	0235	0.4	0841	4.9	1439	1.2	2034	5.3
21	0259	0.6	0903	5.0	1511	1.0	2106	5.1
22	0322	0.8	0928	5.1	1543	1.0	2140	4.8
23	0345	1.1	0950	5.1	1616	0.9	2215	4.5
24	0410	1.4	1018	5.1	1657	1.0	2256	4.1
25	0436	1.8	1047	5.0	1743	1.1	2345	3.6
26	0504	2.2	1126	4.9	1848	1.2	---	---
27	0103	3.3	0540	2.5	1215	4.8	2008	1.2
28	0305	3.2	0655	2.8	1332	4.7	2137	1.0
29	0443	3.5	0902	2.9	1507	4.7	2250	0.6
30	0536	3.9	1037	2.6	1627	5.0	2343	0.2

ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

TABLE 21
SAN NICOLAS ISLAND TIDES
33 Deg 16 Min N, 119 Deg 30 Min W - CENTRAL PART NE COAST

DATE	TIME PST	MGT FT	TIME PST	MGT FT	TIME PST	MGT FT	TIME PST	MGT FT
1	0605	3.3	1043	2.5	1659	5.0	---	---
2	0025	0.2	0647	3.6	1152	2.1	1752	5.4
3	0110	-0.3	0724	4.1	1236	1.7	1844	5.8
4	0150	-0.5	0758	4.5	1333	1.3	1932	6.0
5	0228	-0.7	0833	4.8	1422	0.8	2021	6.1
6	0307	-0.6	0912	5.1	1510	0.5	2107	5.9
7	0346	-0.5	0949	5.3	1558	0.4	2157	5.6
8	0424	0.0	1029	5.4	1651	0.4	2247	5.0
9	0503	0.5	1111	5.3	1747	0.5	2345	4.4
10	0546	1.1	1158	5.1	1852	0.7	---	---
11	0054	3.7	0635	1.7	1254	4.8	2012	0.8
12	0227	3.3	0736	2.2	1400	4.6	2144	0.8
13	0424	3.3	0912	2.5	1521	4.5	2304	0.6
14	0547	3.5	1045	2.5	1637	4.6	0004	0.5*
15	0639	3.7	1153	2.3	1738	4.7	---	---
16	0050	0.3	0714	4.0	1239	2.0	1828	4.8
17	0125	0.2	0741	4.2	1318	1.7	1995	4.9
18	0157	0.2	0804	4.3	1348	1.5	1939	5.0
19	0222	0.3	0826	4.5	1420	1.3	2011	5.0
20	0245	0.4	0848	4.6	1449	1.1	2041	4.9
21	0309	0.5	0910	4.6	1521	0.9	2113	4.7
22	0334	0.7	0935	4.7	1593	0.9	2147	4.5
23	0355	1.0	0957	4.7	1626	0.8	2222	4.2
24	0420	1.3	1025	4.7	1707	0.9	2303	3.8
25	0446	1.6	1054	4.6	1753	1.0	2352	3.4
26	0514	2.0	1133	4.6	1858	1.1	---	---
27	0110	3.1	0550	2.4	1222	4.5	2016	1.1
28	0312	3.0	0705	2.6	1339	4.4	2147	0.9
29	0450	3.3	0912	2.7	1514	4.5	2380	0.5
30	0543	3.6	1047	2.5	1634	4.2	2353	0.2

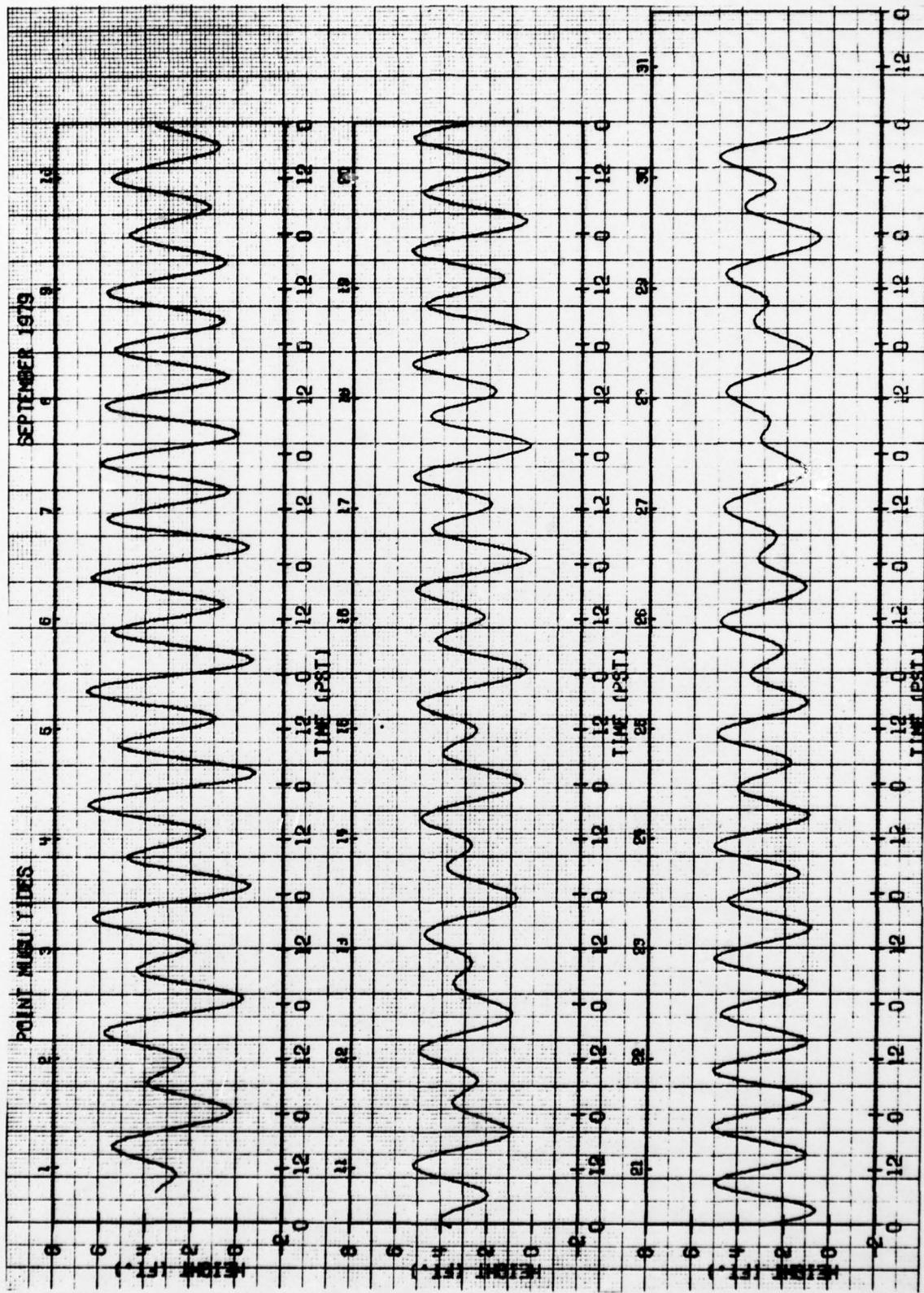


Figure 9. Tidal Graph for Point Mugu, September 1979.

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TABLE 22
POINT MUGU TIDES
34 DEG 06 MIN N. 119 DEG 06 MIN W - OCEAN PIER
OCTOBER 1979

DATE	TIME PST	HGT FT											
1	0616	4-4	1141	2-1	1732	5-4	---	---	1	0623	4-1	1151	1-9
2	0626	-0-1	0648	2-9	1232	1-5	1824	5-6	2	0656	-0-1	0655	4-6
3	0108	-0-3	0722	5-3	1319	0-8	1917	5-9	3	0118	-0-3	0729	4-9
4	0147	-0-3	0754	5-6	1406	0-2	2005	5-9	4	0157	-0-3	0801	5-4
5	0222	-0-1	0829	6-1	1451	-0-2	2054	5-7	5	0232	-0-1	0836	5-6
6	0303	-0-2	0905	6-2	1537	-0-3	2143	5-3	6	0313	-0-2	0912	5-7
7	0339	0-7	0944	6-2	1626	-0-3	2232	4-8	7	0349	0-6	0951	5-7
8	0417	1-2	1023	6-0	1718	-0-1	2332	4-3	8	0427	1-1	1030	5-6
9	0457	1-8	1106	5-7	1817	0-2	---	---	9	0507	1-6	1113	5-3
10	0942	3-8	0545	2-4	1154	5-2	1926	0-5	10	0649	3-5	0555	2-2
11	0215	3-6	0651	2-6	1257	4-8	2049	0-7	11	0222	3-4	0701	2-6
12	0406	3-6	0639	3-0	1423	4-4	2208	0-8	12	0415	3-4	0849	2-8
13	0516	3-9	1027	2-8	1551	4-3	2312	0-7	13	0523	3-6	1037	2-6
14	0559	4-2	1131	2-5	1700	4-4	2357	0-6	14	0606	3-9	1141	2-3
15	0630	4-5	1217	2-1	1753	4-6	---	---	15	0637	4-2	1227	1-9
16	0034	0-6	0656	4-7	1252	1-7	1835	4-7	16	0044	0-5	0703	4-4
17	0104	0-6	0717	4-9	1324	1-3	1913	4-8	17	0114	0-5	0724	4-6
18	0129	0-7	0739	5-1	1356	0-9	1947	4-8	18	0139	0-6	0746	4-7
19	0154	0-9	0800	5-3	1424	0-6	2021	4-7	19	0204	0-8	0807	4-9
20	0219	1-0	0823	5-5	1456	0-4	2056	4-0	20	0229	0-9	0830	5-1
21	0244	1-2	0846	5-6	1528	0-3	2131	4-4	21	0254	1-1	0853	5-2
22	0306	1-5	0912	5-6	1606	0-2	2211	4-1	22	0316	1-4	0919	5-2
23	0335	1-6	0939	5-6	1646	0-2	2256	3-8	23	0345	1-6	0946	5-2
24	0403	2-1	1013	5-5	1732	0-3	2356	3-5	24	0413	1-9	1020	5-1
25	0439	2-5	1052	5-2	1827	0-5	---	---	25	0449	2-3	1059	4-8
26	0116	3-4	0527	2-7	1143	5-0	1941	0-6	26	0123	3-2	0537	2-5
27	0255	3-5	0657	3-0	1259	4-7	2058	0-5	27	0302	3-3	0707	2-8
28	0414	3-6	0901	2-9	1435	4-5	2208	0-4	28	0421	3-5	0911	2-7
29	0502	4-3	1034	2-5	1606	4-6	2305	0-3	29	0509	4-0	1044	2-3
30	0539	4-6	1138	1-6	1718	4-6	2351	0-2	30	0546	4-5	1148	1-6
31	0616	5-3	1230	1-0	1816	5-0	---	---	31	0623	4-9	1240	0-9

AUD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

* -- TIDE OCCURS ON NEXT DATE.
AUD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

TABLE 23
SAN NICOLAS ISLAND TIDES
33 DEG 16 MIN N. 119 DEG 30 MIN W - CENTRAL PART NE COAST
OCTOBER 1979

DATE	TIME PST	HGT FT										
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
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28												
29												
30												
31												

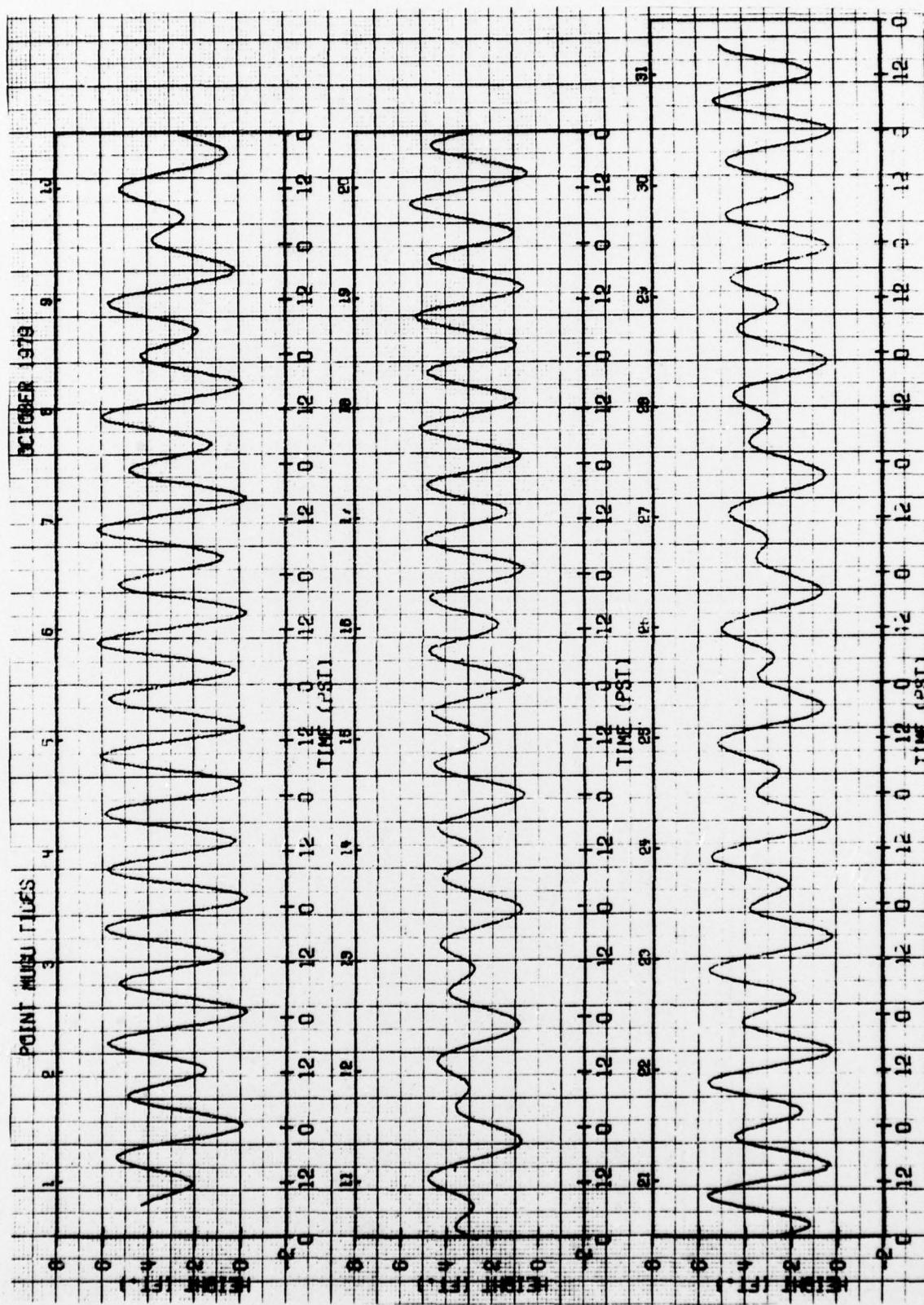


Figure 10. Tidal Graph for Point Mugu, October 1979.

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TABLE 2A POINT MOGUE TIDES 34 URG 06 MIN NO 119 DEG 06 MIN A - OCEAN PIEK						
DATE	TIME	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0035	0.7	0649	5.4	1316	0.3
2	0114	0.4	0725	6.2	1401	-0.3
3	0152	0.6	0800	6.5	1445	-1.7
4	0229	0.9	0836	6.5	1524	-1.4
5	0306	1.3	0912	6.4	1614	-0.8
6	0345	1.8	0950	6.2	1702	-0.6
7	0427	2.2	1029	5.7	1753	-0.4
8	0503	3.7	0512	2.5	1114	5.2
9	0153	3.6	0612	2.9	1204	4.7
10	0324	3.7	0754	3.1	1316	4.2
11	0431	4.0	0952	2.9	1446	3.9
12	0513	4.2	1106	2.5	1614	3.8
13	0546	4.5	1155	2.1	1714	3.9
14	0611	4.8	1234	1.5	1809	4.0
15	0015	1.1	0635	5.1	1309	1.0
16	0043	1.2	0758	5.4	1320	0.6
17	0112	1.3	0722	5.6	1412	0.4
18	0140	1.4	0747	5.8	1444	-0.1
19	0206	1.6	0815	6.0	1519	-0.3
20	0238	1.8	0846	6.0	1555	-0.5
21	0310	2.0	0918	6.0	1636	-0.5
22	0348	2.3	0953	5.8	1721	-0.4
23	0433	2.5	1038	5.6	1814	-0.2
24	0104	3.7	0532	6.7	1132	5.1
25	0220	3.8	0701	2.8	1243	4.7
26	0325	4.2	0853	2.6	1413	4.3
27	0420	4.6	1024	2.1	1545	4.1
28	0503	5.1	1131	1.4	1705	4.1
29	0544	5.6	1227	0.6	1813	4.2
30	0623	6.0	1313	-0.1	1909	-0.3

* -- TIDE OCCURS ON NEXT DATE.

TABLE 2B SAN NICOLAS ISLAND TIDES 33 URG 10 MIN NO 119 DEG 30 MIN A - CENTRAL PART NE COAST						
DATE	TIME	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0045	0.2	0656	5.4	1326	0.3
2	0124	0.4	0732	5.7	1411	-0.3
3	0202	0.5	0807	6.0	1455	-0.6
4	0239	0.8	0843	6.0	1538	-0.7
5	0316	1.2	0919	5.9	1624	-0.7
6	0355	1.6	0957	5.7	1712	-0.5
7	0437	2.0	1036	5.3	1803	-0.2
8	0522	2.4	1121	4.8	1900	0.2
9	0622	2.7	1211	4.4	2006	0.5
10	0331	3.5	0804	2.9	1323	3.9
11	0348	3.7	1002	2.7	1453	3.6
12	0520	3.9	1116	2.4	1621	3.5
13	0553	4.2	1205	1.9	1725	3.6
14	0618	4.5	1244	1.4	1816	3.7
15	0025	5.0	0642	4.7	1319	0.9
16	0553	1.1	0705	5.0	1330	0.5
17	0122	1.2	0729	5.2	1422	0.2
18	0150	1.3	0754	5.4	1454	-0.1
19	0216	1.5	0822	5.6	1529	-0.3
20	0248	1.6	0853	5.6	1605	-0.5
21	0320	1.8	0925	5.6	1646	-0.5
22	0358	2.1	1000	5.4	1731	-0.4
23	0443	2.3	1045	5.2	1824	-0.2
24	0111	3.5	0542	2.5	1139	4.7
25	0227	3.5	0711	2.6	1250	4.4
26	0332	3.9	0903	2.5	1420	4.0
27	0427	4.3	1034	1.9	1552	3.8
28	0510	4.7	1141	1.3	1712	3.8
29	0551	5.2	1237	0.5	1820	3.9
30	0630	5.6	1323	-0.1	1916	4.0

* -- TIDE OCCURS ON NEXT DATE.

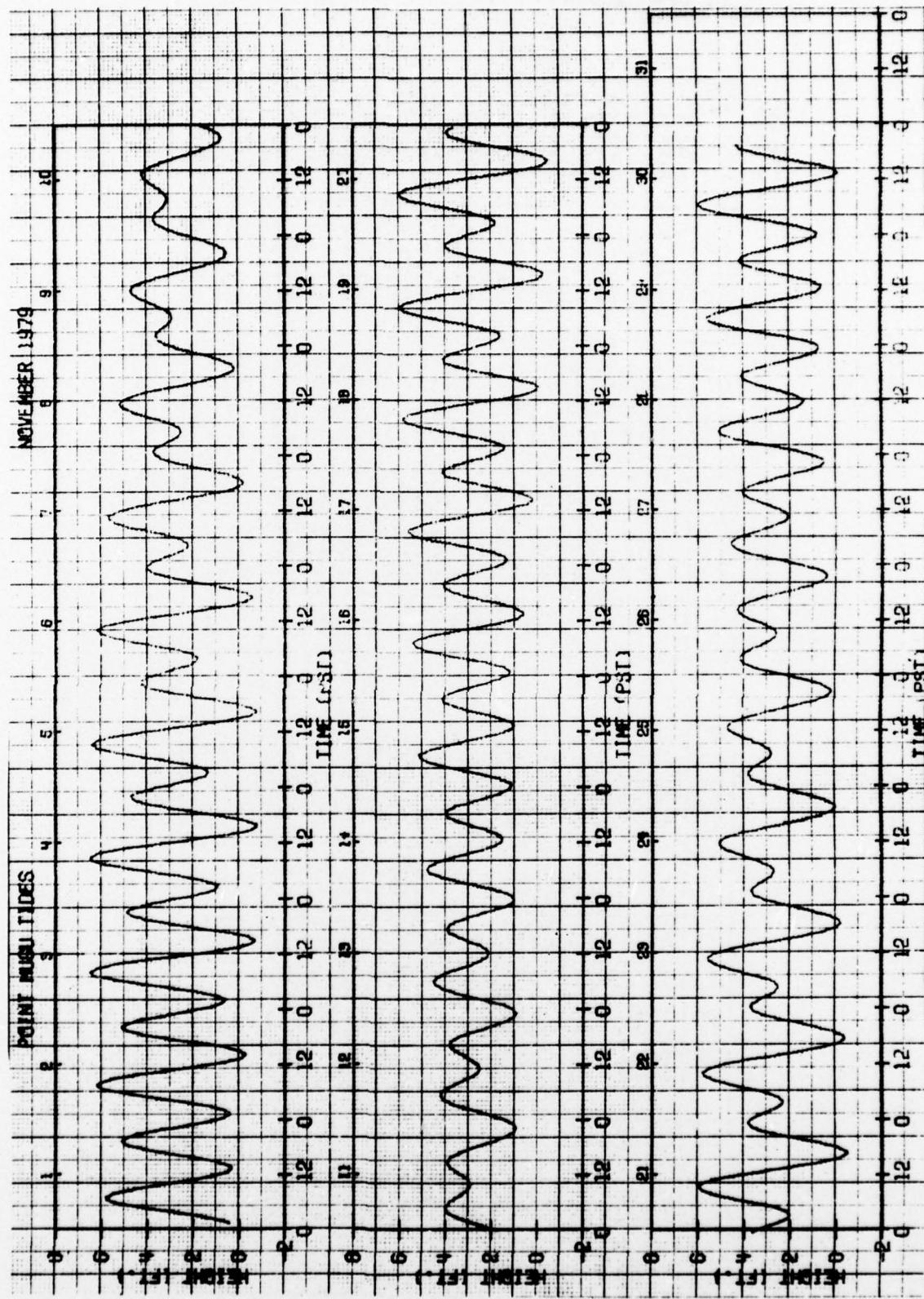


Figure 11. Tidal Graph for Point Mugu, November 1979.

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TABLE 26
POINT MUGU TIDES
34 DEG 06 MIN N 119 DEG 06 MIN W - OCEAN PIE

DATE	TIME	MGT	PST	TIME	MGT	PST	TIME	MGT	PST	TIME	MGT	PST
	PST	FT		PST	FT		PST	FT		PST	FT	
1	0045	1.0	0659	6.4	1359	-0.6	2002	4.3	0055	0.9	1409	-0.5
2	0127	1.2	0737	6.6	1441	-1.0	2050	4.3	0137	1.1	0744	6.1
3	0205	1.5	0813	6.6	1523	-1.1	2138	4.2	0215	1.4	0820	6.1
4	0244	1.7	0849	6.6	1602	-1.0	2224	4.0	0254	1.5	0856	5.9
5	0320	2.0	0926	6.2	1644	-0.8	2312	3.9	0330	1.8	0935	5.7
6	0402	2.3	1003	5.8	1726	-0.5	0012	2.1	0412	3.5	1736	-0.5
7	0005	3.0	0444	2.5	1042	5.3	1812	-0.1	0112	3.5	0454	2.4
8	0107	3.7	0537	2.7	1121	4.8	1901	0.3	0114	3.5	0547	2.5
9	0209	3.7	0654	2.9	1214	4.2	1954	0.7	0216	3.5	0704	2.7
10	0315	3.9	0836	2.9	1326	4.7	2049	1.0	0322	3.6	0846	2.7
11	0406	4.1	1013	2.5	1501	3.3	2144	1.2	0413	3.8	1023	2.4
12	0449	4.4	1122	2.1	1631	3.2	2233	1.4	0456	4.1	1132	1.9
13	0521	4.7	1211	1.5	1739	3.3	2315	1.5	0528	4.4	1221	1.4
14	0550	5.0	1250	0.4	1835	3.4	2355	1.6	0557	4.6	1300	0.6
15	0619	5.4	1322	0.6	1922	3.6	0000	1.0	0626	5.0	1332	0.4
16	0311	1.7	0634	5.7	1357	-0.1	2003	3.7	0116	5.3	1407	0.1
17	0106	1.8	0714	6.0	1431	-0.5	2042	3.4	0116	5.6	1441	-0.1
18	0143	1.8	0753	6.2	1507	-0.8	2123	3.4	0153	1.6	0800	5.7
19	0218	1.9	0827	6.4	1546	-1.0	2205	3.9	0228	1.7	0834	5.9
20	0258	1.9	0906	6.3	1625	-1.0	2250	4.0	0308	1.7	0913	5.8
21	0343	2.1	0947	6.2	1707	-0.9	2339	4.0	0353	1.9	0954	5.7
22	0433	2.2	1033	5.4	1756	-0.7	0000	1.1	0443	2.0	1040	5.4
23	0031	4.1	0537	2.3	1125	5.3	1840	0.3	0138	3.8	0547	2.1
24	0132	4.2	0654	2.4	1231	4.6	1939	0.1	0139	3.9	0704	2.2
25	0233	4.5	0832	2.2	1352	4.0	2040	0.6	0240	4.2	0842	2.0
26	0332	4.8	1006	1.7	1530	3.6	2142	0.9	0339	4.5	1016	1.5
27	0427	5.2	1124	1.0	1702	3.5	2242	1.2	0434	4.8	1134	0.9
28	0515	5.6	1223	0.3	1819	3.6	2337	1.5	0522	5.2	1233	0.3
29	0603	6.0	1313	-0.3	1917	3.7	0010	5.6	0610	5.6	1323	-0.3
30	0026	1.6	0642	6.2	1356	-0.7	2009	3.4	0036	1.5	0649	5.7
31	0111	1.7	0721	6.4	1436	-1.0	2051	4.0	0121	1.5	0728	5.9

* -- TIDE OCCURS ON NEXT DATE.

TABLE 27 SAN NICOLAS ISLAND TIDES 33 DEG 16 MIN N 119 DEG 30 MIN W - CENTRAL PART W COAST DECEMBER 1979													
DATE	TIME	MGT	PST	TIME	MGT	PST	TIME	MGT	PST	TIME	MGT	PST	
	PST	FT		PST	FT		PST	FT		PST	FT		
1				0055	0.9		0706	5.9		1409	-0.5	2009	4.0
2				0137	1.1		0744	6.1		1451	-0.9	2057	4.0
3				0215	1.4		0820	6.1		1533	-1.6	2145	3.9
4				0254	1.5		0856	5.9		1612	-0.9	2231	3.7
5				0330	1.8		0935	5.7		1654	-0.7	2319	3.6
6				0412	2.1		1010	5.4		1736	-0.5	2400	3.5
7				0454	2.4		1049	4.9		1822	-0.1	2443	3.4
8				0547	2.5		1121	5.2		1911	0.3	2525	3.3
9				0626	3.0		1221	5.0		1992	0.6	2604	3.2
10				0704	3.5		1333	3.5		2059	0.9	2659	3.1
11				0846	2.7		1508	3.1		2154	1.1	2743	3.0
12				1023	2.4		1638	3.0		2243	1.3	2825	3.0
13				1132	1.9		1746	3.1		2325	1.4	2905	3.0
14				1221	1.4		1842	3.2		2396	1.5	2985	3.0
15				1332	3.4		1929	3.4		2466	1.1	3065	3.0
16				1407	0.1		2010	3.5		2541	1.1	3146	3.0
17				1441	-0.1		2049	3.5		2621	1.1	3227	3.0
18				1517	-0.7		2130	3.6		2702	1.1	3308	3.0
19				1556	-0.9		2182	3.6		2783	1.1	3389	3.0
20				1635	-0.9		2257	3.7		2863	1.1	3470	3.0
21				1717	-0.8		2346	3.7		2943	1.1	3551	3.0
22				1806	-0.6		3049	3.5		3024	1.1	3632	3.0
23				1846	-0.3		3138	3.6		3112	4.9	3716	3.0
24				1939	0.1		3218	3.9		3197	4.3	3797	3.0
25				2040	0.6		3294	4.2		3282	4.3	3878	3.0
26				2142	0.9		3379	4.5		3367	4.4	3959	3.0
27				2242	1.2		3454	4.8		3457	4.4	4040	3.0
28				2337	1.5		3534	4.8		3547	4.4	4121	3.0
29				2437	1.5		3614	5.2		3641	4.4	4202	3.0
30				2537	1.7		3694	5.7		3722	4.4	4283	3.0
31				2637	1.0		3774	5.9		3803	4.4	4364	3.0

* -- TIDE OCCURS ON NEXT DATE.

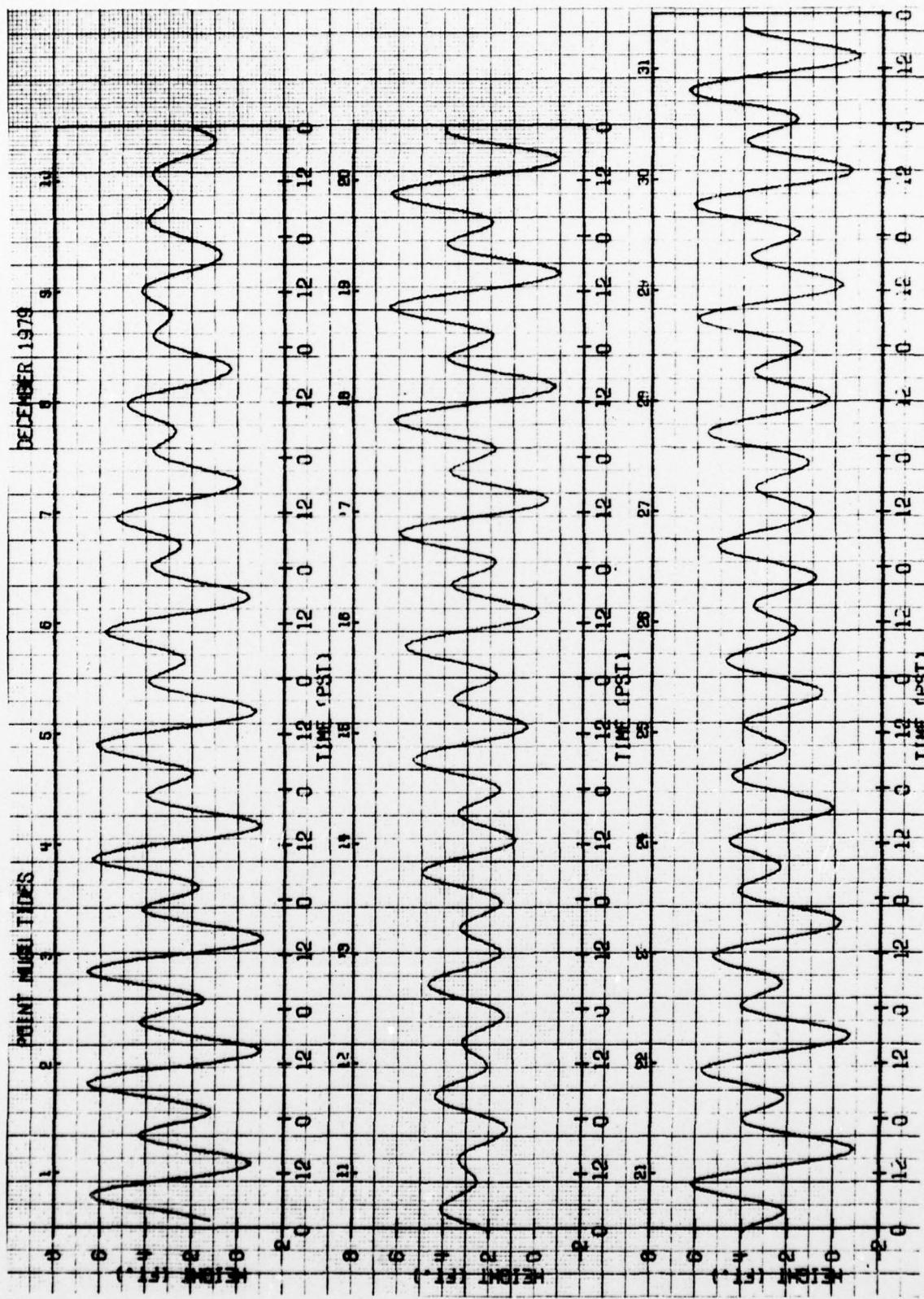


Figure 12. Tidal Graph for Point Mugu, December 1979.

Table 28. Moonrise and Moonset, Barking Sands, Hawaii, 1979

Date	January		February		March		April		May		June		Date
	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	
1	0954	2144	1049	2329	0924	2212	1017	2342	1036	---	1148	0003	1
2	1042	2245	1132	---	1008	2310	1106	---	1126	0001	1237	0041	2
3	1127	2344	1215	0026	1053	---	1155	0033	1216	0045	1326	0118	3
4	1210	---	1258	0121	1139	0006	1245	0122	1306	0127	1417	0155	4
5	1252	0042	1343	0214	1226	0100	1334	0207	1356	0206	1508	0232	5
6	1333	0138	1430	0306	1313	0151	1424	0249	1445	0243	1601	0310	6
7	1416	0232	1517	0356	1402	0240	1514	0330	1535	0320	1657	0352	7
8	1459	0326	1606	0444	1451	0327	1603	0408	1627	0358	1754	0436	8
9	1545	0418	1655	0529	1541	0410	1653	0446	1719	0436	1854	0525	9
10	1632	0510	1745	0612	1630	0452	1744	0523	1814	0516	1954	0618	10
11	1720	0559	1835	0653	1720	0532	1836	0601	1910	0559	2052	0716	11
12	1810	0647	1924	0732	1810	0610	1929	0640	2008	0645	2149	0817	12
13	1859	0731	2014	0810	1900	0647	2023	0720	2107	0735	2241	0919	13
14	1949	0814	2104	0847	1950	0724	2119	0804	2205	0830	2330	1022	14
15	2039	0854	2154	0924	2042	0802	2216	0851	2301	0927	---	1123	15
16	2128	0932	2245	1002	2134	0841	2313	0941	2354	1027	0016	1223	16
17	2217	1009	2338	1041	2229	0922	---	1036	---	1128	0100	1322	17
18	2307	1046	---	1123	2324	1006	0009	1133	0044	1228	0143	1420	18
19	2358	1123	0033	1208	---	1053	0104	1233	0131	1329	0226	1517	19
20	---	1201	0130	1257	0021	1145	0156	1333	0216	1428	0309	1613	20
21	0051	1242	0228	1352	0117	1240	0245	1435	0300	1527	0354	1709	21
22	0146	1326	0327	1451	0214	1339	0333	1536	0343	1625	0440	1804	22
23	0243	1415	0425	1553	0309	1441	0418	1636	0426	1723	0528	1857	23
24	0343	1509	0521	1658	0401	1544	0503	1737	0511	1821	0618	1947	24
25	0444	1608	0614	1804	0452	1647	0547	1836	0558	1917	0709	2035	25
26	0544	1711	0705	1908	0540	1750	0633	1936	0646	2012	0800	2119	26
27	0643	1816	0753	2011	0626	1852	0719	2033	0735	2105	0851	2200	27
28	0739	1923	0839	2113	0712	1954	0807	2130	0826	2154	0941	2239	28
29	0831	2028	---	---	0757	2053	0855	2223	0917	2240	1030	2317	29
30	0919	2130	---	---	0843	2152	0945	2314	1008	2323	1119	2353	30
31	1005	2231	---	---	0930	2248	---	---	1058	---	---	---	31
Date	July		August		September		October		November		December		Date
	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	
1	1208	---	1326	0022	1501	0126	1534	0212	1635	0407	1646	0457	1
2	1258	0029	1422	0105	1558	0224	1624	0315	1721	0509	1734	0557	2
3	1350	0106	1519	0152	1654	0325	1712	0418	1808	0611	1824	0657	3
4	1443	0145	1618	0244	1747	0430	1800	0522	1856	0713	1916	0754	4
5	1539	0227	1717	0341	1837	0535	1846	0626	1946	0814	2009	0849	5
6	1637	0313	1815	0442	1926	0640	1933	0729	2037	0912	2103	0939	6
7	1737	0404	1910	0547	2013	0745	2021	0831	2130	1008	2155	1026	7
8	1837	0500	2002	0653	2059	0848	2109	0932	2222	1100	2246	1110	8
9	1936	0600	2051	0758	2145	0949	2159	1031	2314	1148	2336	1150	9
10	2032	0703	2138	0902	2232	1049	2250	1127	---	1233	---	1227	10
11	2124	0808	2223	1004	2319	1147	2341	1219	0005	1314	0026	1304	11
12	2213	0912	2307	1104	---	1243	---	1308	0055	1352	0114	1339	12
13	2259	1015	2352	1203	0008	1336	0032	1354	0144	1429	0204	1415	13
14	2343	1115	---	1300	0057	1426	0122	1436	0234	1506	0254	1453	14
15	---	1215	0037	1355	0147	1513	0212	1516	0323	1542	0345	1532	15
16	0026	1312	0124	1449	0237	1557	0302	1554	0413	1618	0439	1615	16
17	0109	1409	0212	1540	0328	1638	0351	1631	0504	1657	0534	1702	17
18	0153	1505	0301	1629	0417	1717	0440	1707	0566	1738	0632	1754	18
19	0238	1559	0351	1715	0507	1754	0630	1743	0651	1823	0729	1849	19
20	0325	1652	0441	1758	0556	1831	0620	1821	0747	1911	0826	1948	20
21	0414	1743	0531	1838	0645	1907	0711	1900	0843	2004	0921	2049	21
22	0504	1831	0621	1917	0734	1943	0804	1942	0939	2059	1013	2151	22
23	0554	1916	0710	1954	0824	2021	0858	2027	1034	2158	1102	2252	23
24	0645	1959	0759	2030	0916	2101	0953	2116	1126	2257	1147	2352	24
25	0735	2039	0848	2106	1008	2143	1048	2209	1215	2357	1231	---	25
26	0825	2116	0937	2142	1102	2229	1143	2304	1302	---	1314	0052	26
27	0914	2153	1028	2221	1157	2319	1236	---	1347	0067	1358	0150	27
28	1003	2229	1119	2301	1252	---	1328	0003	1431	0157	1442	0249	28
29	1052	2305	1213	2345	1347	0013	1417	0103	1515	0257	1528	0348	29
30	1142	2343	1308	---	1441	0111	1504	0204	1559	0357	1616	0446	30
31	1233	---	1404	0034	---	---	1550	0306	---	---	1706	0543	31

TABLE 29
PORT ALLEN TIDES
21 DEG 54 MIN N 159 DEG 35 MIN W - HANALEI HAY
JANUARY 1979

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0533	2.1	1258	0.0	1809	0.7	2325	0.1
2	0616	1.9	1344	0.0	1919	0.8	----	---
3	0024	0.3	0702	1.7	1432	-0.1	2040	0.9
4	0144	0.5	0753	1.5	1520	-0.1	2201	1.1
5	0328	0.6	0848	1.2	1608	-0.1	2310	1.3
6	0522	0.6	0954	1.0	1653	-0.1	----	---
7	0010	1.5	0658	0.6	1100	0.8	1735	-0.1
8	0058	1.7	0811	0.5	1202	0.7	1820	-0.1
9	0137	1.8	0856	0.4	1301	0.6	1859	-0.1
10	0215	1.9	0937	0.3	1345	0.6	1935	-0.1
11	0249	1.9	1010	0.2	1429	0.6	2010	-0.1
12	0321	1.9	1041	0.2	1507	0.6	2045	-0.1
13	0350	1.9	1113	0.2	1543	0.6	2118	-0.1
14	0421	1.9	1142	0.1	1622	0.7	2152	0.0
15	0450	1.8	1211	0.1	1703	0.7	2228	0.1
16	0521	1.7	1242	0.1	1748	0.7	2306	0.2
17	0550	1.7	1314	0.1	1843	0.8	----	---
18	2352	0.4*	0622	1.5	1347	0.1	1946	0.9
19	0052	0.6	0701	1.3	1424	0.1	2102	1.0
20	0220	0.6	0747	1.1	1506	0.1	2214	1.2
21	0419	0.6	0844	0.9	1556	0.0	2316	1.4
22	0612	0.6	1001	0.8	1645	-0.1	----	---
23	0010	1.7	0725	0.5	1117	0.7	1738	-0.1
24	0058	1.8	0817	0.3	1229	0.6	1827	-0.2
25	0143	2.0	0902	0.2	1328	0.6	1919	-0.3
26	0225	2.1	0940	0.0	1420	0.7	2006	-0.3
27	0308	2.2	1020	0.0	1510	0.8	2053	-0.3
28	0348	2.2	1057	-0.1	1600	0.8	2142	-0.2
29	0430	2.1	1137	-0.1	1652	0.9	2232	-0.1
30	0511	1.9	1216	-0.1	1748	1.0	2323	0.1
31	0550	1.7	1256	-0.1	1847	1.0	----	---

* -- TIME OCCURS ON PREVIOUS DATE.

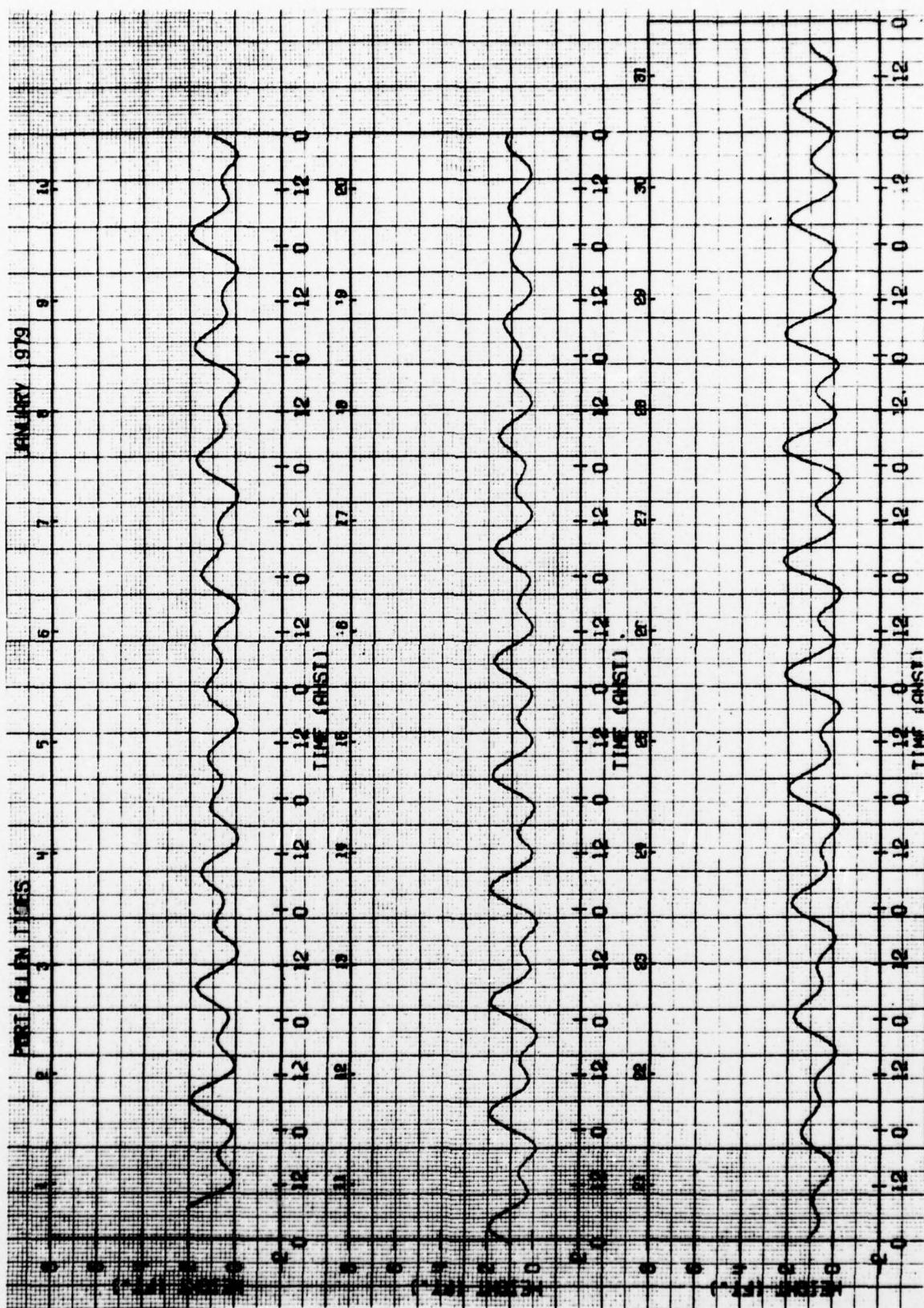


Figure 13. Tidal Graph for Port Allen, January 1979.

TABLE 30
PORT ALLEN TIDES
FEBRUARY 1979
21 DEG 54 MIN N. 159 DEG 35 MIN W = MANAHEPE BAY

DATE	TIME AMST	HGT FT	TIME AMST	HGT FT	TIME AMST	HGT FT	TIME AMST	HGT FT
1	0025	0.3	0629	1.5	1336	-0.1	1955	1.1
2	0141	0.5	0710	1.2	1421	0.0	2115	1.2
3	0320	0.6	0806	1.0	1508	0.0	2228	1.4
4	0526	0.6	0909	0.7	1604	0.0	---	---
5	2337	1.5*	0700	0.5	1035	0.6	1659	0.0
6	0029	1.7	0759	0.4	1154	0.6	1752	0.0
7	0113	1.7	0841	0.3	1252	0.6	1841	0.0
8	0152	1.7	0912	0.2	1340	0.6	1921	-0.1
9	0225	1.8	0940	0.2	1419	0.7	2001	-0.1
10	0257	1.8	1006	0.1	1454	0.7	2036	-0.1
11	0326	1.8	1033	0.1	1530	0.8	2112	0.0
12	0355	1.7	1056	0.1	1605	0.9	2147	0.0
13	0423	1.7	1118	0.1	1640	0.9	2222	0.1
14	0450	1.6	1145	0.1	1719	1.0	2304	0.2
15	0517	1.5	1211	0.1	1804	1.0	---	---
16	2353	0.4*	0549	1.3	1242	0.1	1856	1.1
17	0053	0.5	0624	1.1	1318	0.1	2002	1.2
18	0214	0.6	0706	0.9	1400	0.1	2115	1.3
19	0407	0.6	0809	0.7	1458	0.1	2231	1.5
20	0557	0.5	0938	0.6	1603	0.0	---	---
21	2336	1.7*	0706	0.4	1114	0.6	1709	0.0
22	0029	1.8	0753	0.2	1228	0.6	1812	-0.1
23	0119	1.9	0833	0.1	1324	0.7	1910	-0.2
24	0205	2.0	0909	0.0	1414	0.9	2003	-0.2
25	0246	2.0	0944	-0.1	1503	1.0	2055	-0.2
26	0328	1.9	1020	-0.2	1548	1.1	2144	-0.2
27	0407	1.8	1054	-0.2	1635	1.2	2236	0.0
28	0445	1.7	1126	-0.1	1724	1.3	2329	0.1

* -- TIDE OCCURS ON PREVIOUS DATE.

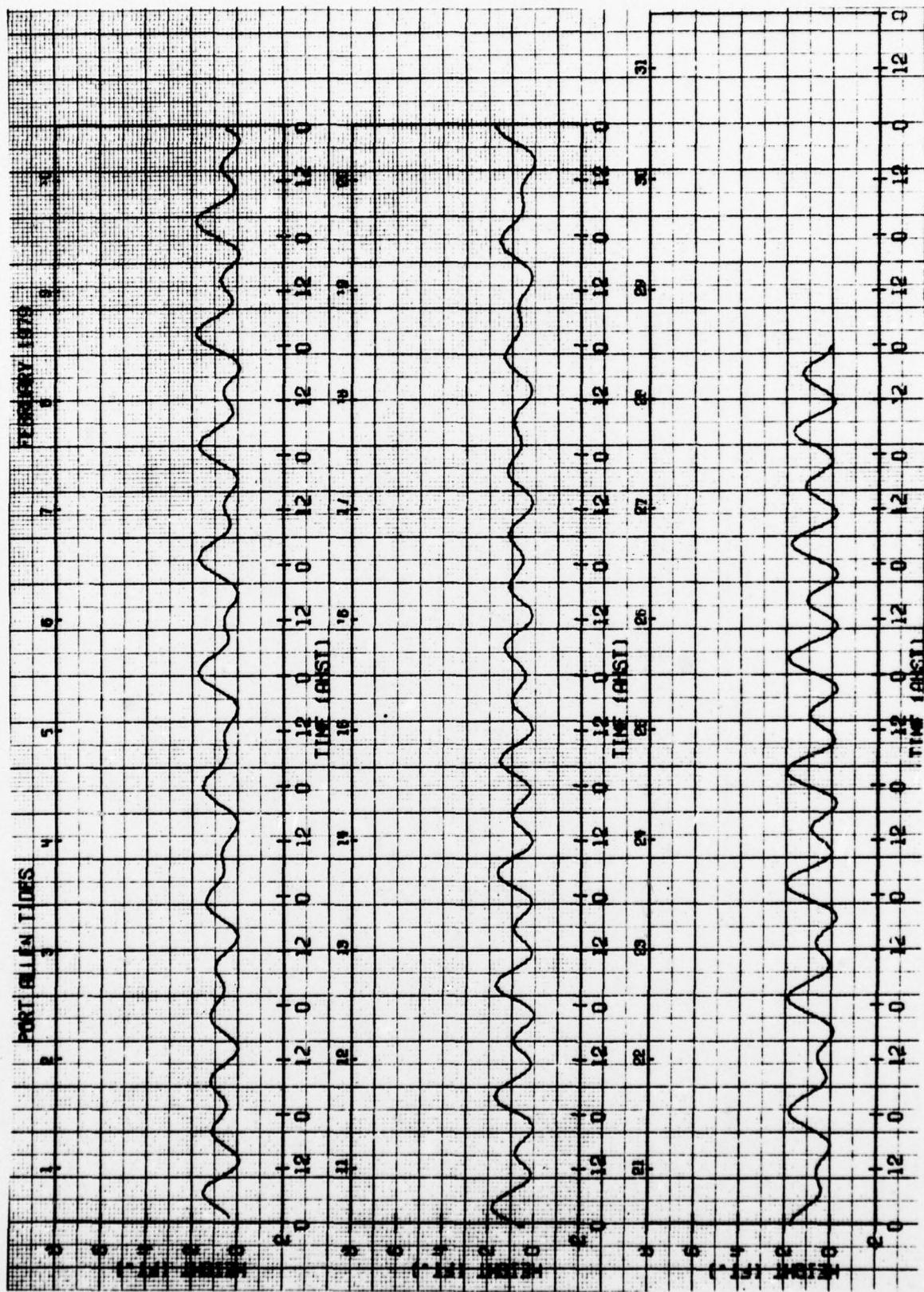


Figure 14. Tidal Graph for Port Allen, February 1979.

TABLE 31
PORT ALLEN TIDES
21 DEG 54 MIN N, 159 DEG 35 MIN W - MANAPEPE HAY
MARCH 1974

DATE	TIME AMST	HGT FT	TIME AMST	HGT FT	TIME AMST	HGT FT	TIME AMST	HGT FT
1	0524	1.4	1202	-0.1	1814	1.3	----	---
2	0027	0.3	0603	1.2	1238	0.0	1913	1.4
3	0139	0.4	0641	0.9	1318	0.0	2019	1.4
4	0314	0.5	0733	0.7	1405	0.1	2135	1.4
5	0511	0.5	0849	0.6	1504	0.1	2248	1.5
6	0641	0.4	1030	0.6	1617	0.2	----	---
7	2347	1.6*	0726	0.3	1151	0.6	1726	0.2
8	0037	1.6	0758	0.3	1245	0.6	1822	0.1
9	0119	1.7	0827	0.2	1328	0.7	1908	0.1
10	0154	1.7	0855	0.1	1404	0.9	1953	0.0
11	0225	1.7	0917	0.1	1439	1.0	2031	0.0
12	0257	1.6	0942	0.1	1511	1.1	2110	0.0
13	0323	1.6	1004	0.0	1543	1.1	2145	0.1
14	0351	1.5	1028	0.0	1618	1.2	2225	0.1
15	0416	1.3	1049	0.0	1653	1.3	2310	0.2
16	0449	1.2	1115	0.0	1735	1.4	----	---
17	0001	0.3	0520	1.0	1144	0.0	1824	1.4
18	0102	0.4	0556	0.9	1222	0.0	1920	1.5
19	0224	0.5	0648	0.7	1307	0.1	2029	1.5
20	0405	0.4	0803	0.6	1408	0.1	2145	1.6
21	0535	0.3	0953	0.6	1529	0.1	2256	1.7
22	0636	0.2	1122	0.6	1650	0.1	----	---
23	2357	1.7*	0716	0.1	1228	0.7	1804	0.1
24	0049	1.7	0756	0.0	1320	0.9	1905	0.0
25	0135	1.7	0831	-0.1	1407	1.1	2004	-0.1
26	0220	1.7	0904	-0.2	1453	1.3	2056	-0.1
27	0259	1.6	0936	-0.2	1533	1.5	2149	0.0
28	0338	1.5	1007	-0.2	1618	1.6	2241	0.0
29	0416	1.3	1038	-0.2	1700	1.6	2334	0.1
30	0455	1.1	1109	-0.1	1745	1.6	----	---
31	0033	0.2	0534	0.9	1142	0.0	1835	1.6

* -- TIDE OCCURS ON PREVIOUS DATE.

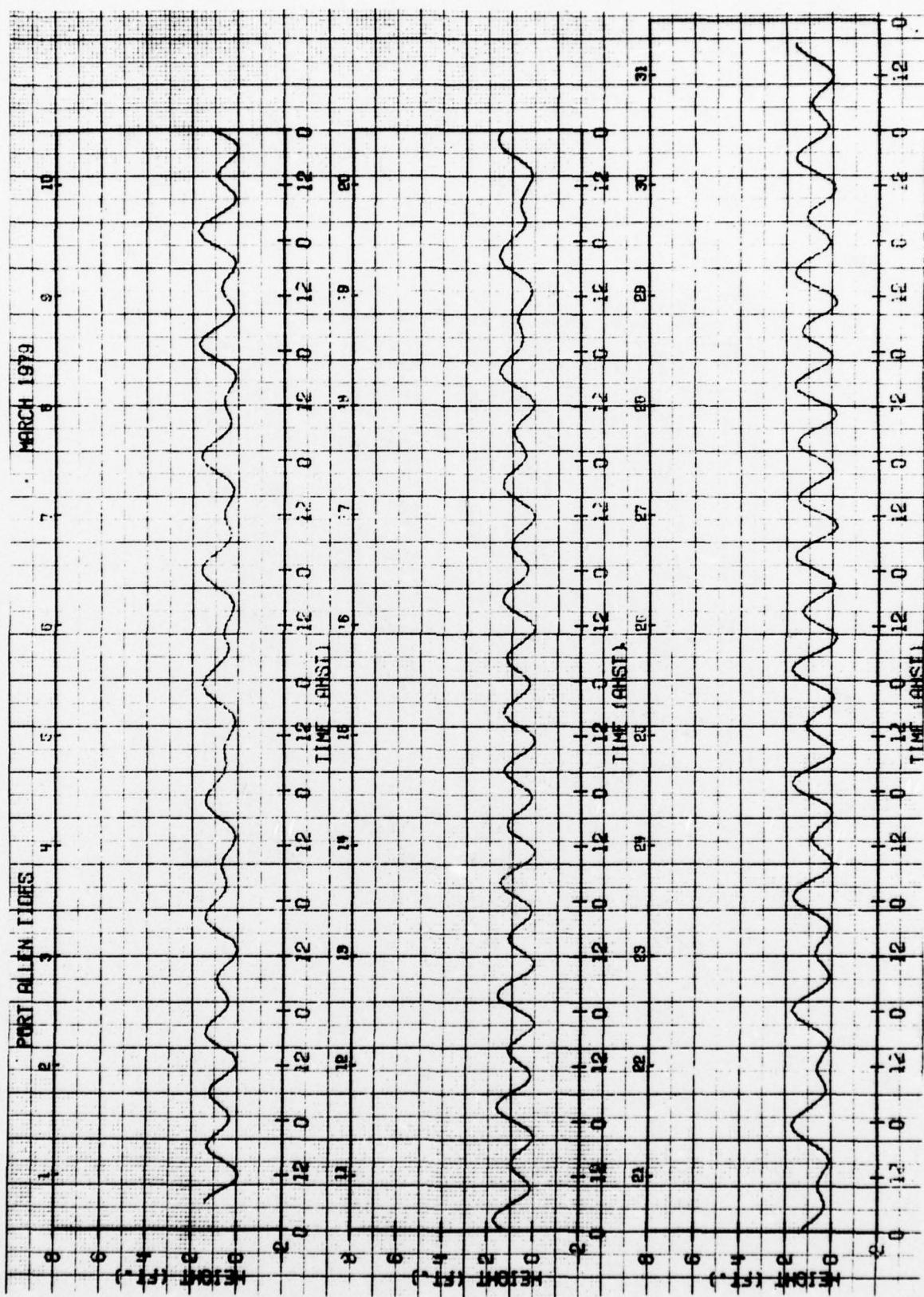


Figure 15. Tidal Graph for Port Allen, March 1979.

TABLE 32
PORT ALLEN TIDES
21 DEG 54 MIN N, 159 DEG 35 MIN W - MANAPEPE BAY
APRIL 1979

DATE	TIME AMST	HGT FT	TIME AMST	HGT FT	TIME AMST	HGT FT	TIME AMST	HGT FT
1	0139	0.3	0619	0.7	1217	0.1	1933	1.5
2	0203	0.4	0715	0.6	1300	0.2	2035	1.5
3	0436	0.4	0842	0.6	1405	0.3	2145	1.5
4	0541	0.3	1025	0.6	1528	0.3	2251	1.5
5	0627	0.2	1139	0.6	1650	0.3	---	---
6	2344	1.5*	0705	0.2	1234	0.8	1759	0.3
7	0029	1.5	0734	0.1	1313	0.9	1852	0.2
8	0108	1.4	0801	0.1	1345	1.1	1940	0.2
9	0143	1.4	0824	0.0	1417	1.2	2025	0.2
10	0218	1.3	0847	0.0	1451	1.3	2107	0.1
11	0248	1.3	0910	-0.1	1523	1.5	2148	0.1
12	0319	1.2	0933	-0.1	1556	1.6	2232	0.2
13	0351	1.0	0959	-0.1	1634	1.7	2318	0.2
14	0423	0.9	1027	-0.1	1713	1.7	---	---
15	0014	0.2	0501	0.8	1059	-0.1	1801	1.7
16	0118	0.3	0548	0.6	1138	0.0	1854	1.7
17	0227	0.3	0652	0.6	1227	0.1	1956	1.7
18	0350	0.2	0825	0.6	1336	0.2	2106	1.7
19	0458	0.1	1007	0.6	1505	0.3	2214	1.6
20	0551	0.0	1125	0.7	1642	0.3	2318	1.6
21	0636	-0.1	1228	0.9	1801	0.3	---	---
22	0010	1.6	0712	-0.1	1314	1.2	1910	0.2
23	0103	1.5	0747	-0.2	1356	1.4	2009	0.1
24	0149	1.4	0819	-0.2	1438	1.6	2104	0.1
25	0233	1.2	0852	-0.2	1517	1.7	2157	0.1
26	0312	1.1	0921	-0.2	1559	1.7	2248	0.1
27	0351	0.9	0952	-0.2	1638	1.8	---	---
28	2340	0.1*	0429	0.7	1021	-0.1	1719	1.7
29	0036	0.2	0511	0.6	1053	0.0	1804	1.7
30	0135	0.2	0600	0.6	1128	0.1	1851	1.7

* -- TIDE OCCURS ON PREVIOUS DATE.

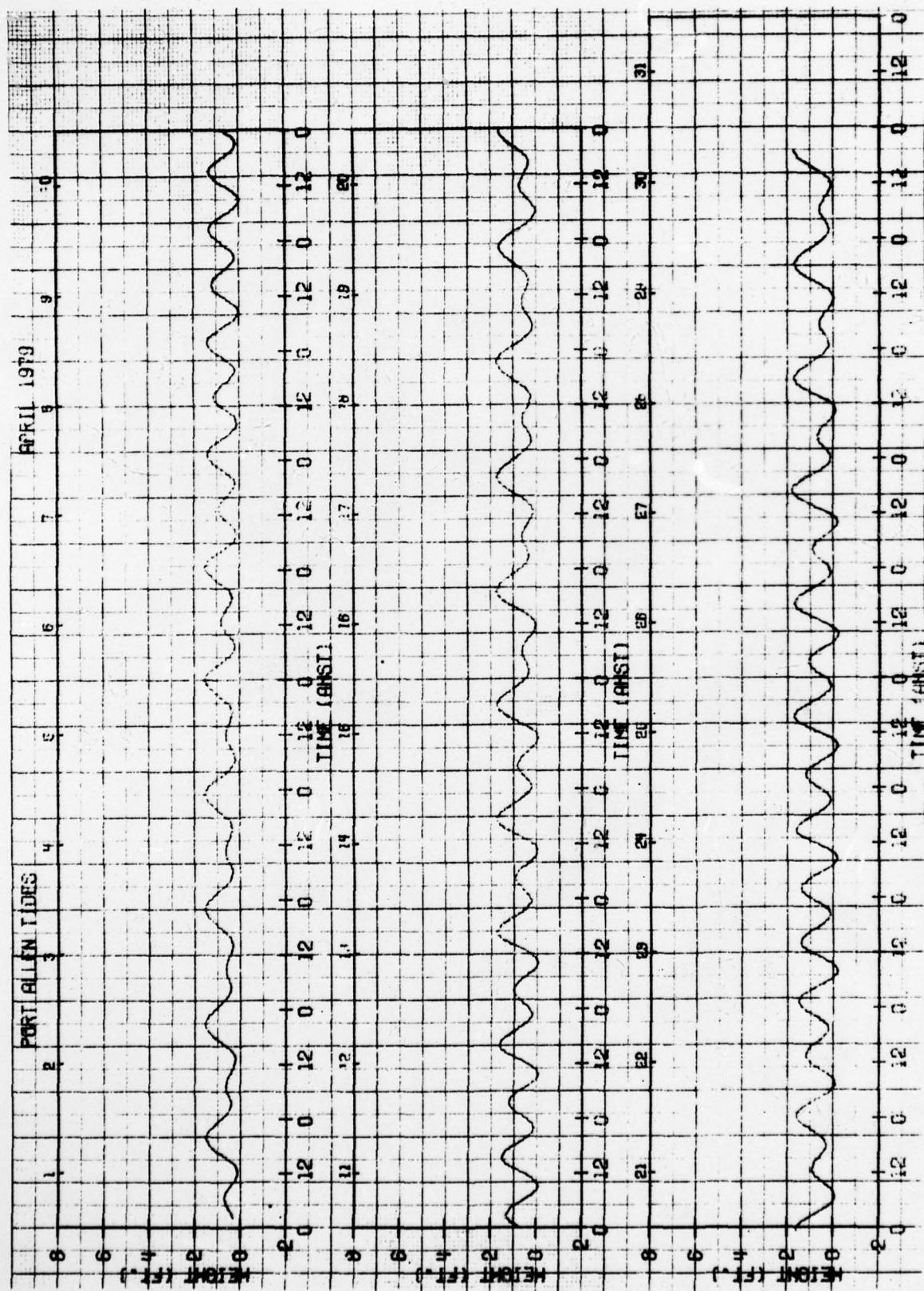


Figure 16. Tidal Graph for Port Allen, April 1979.

TABLE 33
PORT ALLEN TIDES
21 DEG 54 MIN N 159 DEG 35 MIN W - HANAMEPE HAY

MAY 1974

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0241	0.3	0704	0.6	1210	0.2	1942	1.0
2	0346	0.2	0831	0.6	1309	0.3	2041	1.5
3	0442	0.2	1007	0.6	1428	0.4	2139	1.4
4	0527	0.1	1116	0.7	1604	0.5	2237	1.3
5	0602	0.1	1209	0.9	1727	0.5	---	---
6	2330	1.3*	0635	0.0	1247	1.1	1436	0.4
7	0015	1.2	0703	0.0	1323	1.2	1430	0.4
8	0055	1.1	0729	-0.1	1358	1.4	2020	0.3
9	0132	1.1	0753	-0.1	1430	1.6	2107	0.2
10	0211	1.0	0820	-0.2	1502	1.7	2153	0.2
11	0246	0.9	0848	-0.2	1540	1.8	2239	0.1
12	0325	0.8	0920	-0.2	1616	1.9	2328	0.1
13	0407	0.7	0952	-0.2	1658	1.9	---	---
14	0024	0.1	0453	0.6	1030	-0.1	1743	1.9
15	0122	0.1	0550	0.6	1116	0.0	1834	1.8
16	0222	0.1	0705	0.6	1208	0.1	1928	1.7
17	0321	0.0	0836	0.6	1317	0.3	2029	1.7
18	0420	0.0	1007	0.7	1453	0.4	2133	1.6
19	0505	-0.1	1121	0.9	1633	0.5	2236	1.4
20	0549	-0.2	1217	1.2	1802	0.4	---	---
21	2333	1.3*	0628	-0.2	1302	1.4	1917	0.4
22	0027	1.1	0703	-0.3	1348	1.7	2020	0.3
23	0119	1.0	0738	-0.3	1426	1.7	2115	0.2
24	0204	0.9	0809	-0.3	1505	1.9	2208	0.2
25	0246	0.7	0841	-0.2	1543	1.9	2256	0.1
26	0326	0.6	0913	-0.2	1619	1.9	---	---
27	2344	0.1*	0407	0.6	0945	-0.1	1658	1.9
28	0031	0.2	0450	0.6	1017	0.0	1735	1.8
29	0122	0.2	0542	0.6	1052	0.1	1814	1.7
30	0205	0.2	0646	0.6	1134	0.2	1857	1.7
31	0254	0.2	0759	0.6	1226	0.4	1942	1.6

* -- TIDE OCCURS ON PREVIOUS DATE.

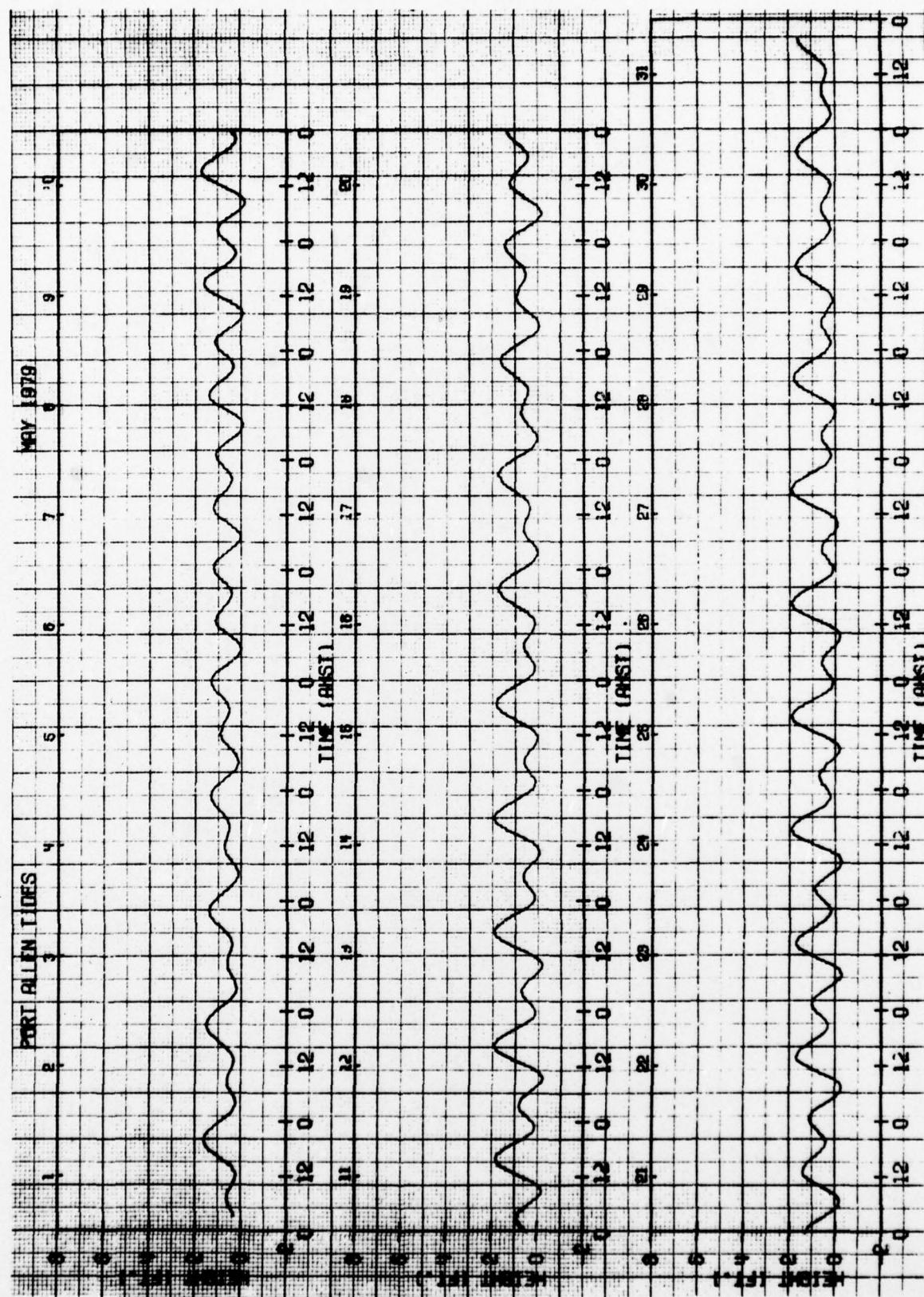


Figure 17. Tidal Graph for Port Allen, May 1979.

TABLE 34
PORT ALLEN TIDES
21 DEG 54 MIN N 159 DEG 35 MIN W - HANALEPE BAY

JUNE 1979

DATE	TIME AMST	HGT FT	TIME AMST	HGT FT	TIME AMST	HGT FT	TIME AMST	HGT FT
1	0339	0.1	0927	0.6	1336	0.5	2032	1.4
2	0420	0.1	1037	0.8	1512	0.6	2125	1.3
3	0458	0.0	1133	1.0	1651	0.6	2221	1.2
4	0533	0.0	1215	1.2	1812	0.6	2312	1.0
5	0605	-0.1	1254	1.4	1919	0.5	---	---
6	0001	0.9	0637	-0.1	1329	1.6	2014	0.4
7	0050	0.8	0708	-0.2	1407	1.7	2107	0.3
8	0135	0.8	0740	-0.2	1443	1.9	2152	0.2
9	0221	0.7	0817	-0.3	1521	2.0	2239	0.1
10	0306	0.6	0852	-0.3	1602	2.1	2326	0.1
11	0355	0.6	0933	-0.2	1644	2.1	---	---
12	0014	0.0	0447	0.6	1015	-0.1	1727	2.1
13	0104	0.0	0552	0.6	1104	0.0	1814	1.9
14	0153	0.0	0701	0.6	1200	0.2	1905	1.8
15	0242	0.0	0823	0.7	1315	0.4	1955	1.7
16	0334	-0.1	0947	0.9	1448	0.6	2055	1.4
17	0421	-0.1	1059	1.1	1634	0.6	2153	1.2
18	0505	-0.2	1201	1.4	1810	0.6	2255	1.0
19	0546	-0.2	1247	1.6	1929	0.5	---	---
20	2355	0.9*	0626	-0.2	1332	1.7	2035	0.4
21	0050	0.8	0703	-0.2	1411	1.9	2124	0.3
22	0140	0.7	0737	-0.2	1450	2.0	2212	0.2
23	0228	0.6	0812	-0.2	1527	2.0	2251	0.2
24	0310	0.6	0846	-0.1	1601	2.0	2330	0.2
25	0350	0.6	0920	-0.1	1634	2.0	---	---
26	0005	0.2	0433	0.6	0955	0.0	1708	1.9
27	0044	0.2	0521	0.6	1030	0.1	1740	1.8
28	0119	0.2	0612	0.6	1112	0.3	1816	1.7
29	0155	0.2	0715	0.7	1201	0.4	1854	1.6
30	0233	0.1	0829	0.7	1300	0.6	1936	1.4

* -- TIDE OCCURS ON PREVIOUS DATE.

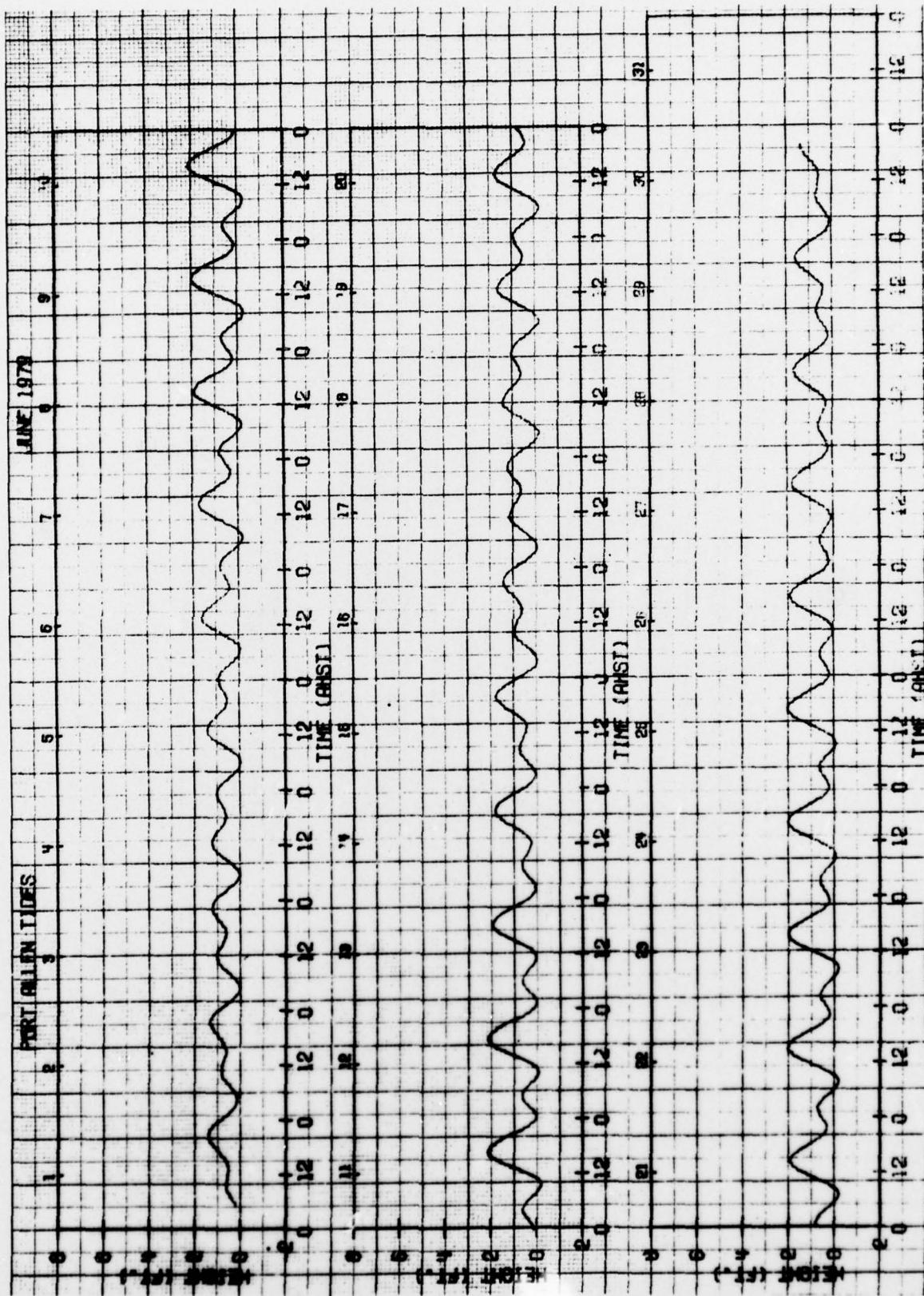


Figure 18. Tidal Graph for Port Allen, June 1979.

TABLE 35
PORT ALLEN TIDES
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANALEI BAY
JULY 1979

DATE	TIME AMST	HGT FT	TIME AMST	HGT FT	TIME AMST	HGT FT	TIME AMST	HGT FT
1	0312	0.1	0938	0.9	1429	0.6	2014	1.3
2	0350	0.1	1044	1.1	1612	0.7	2114	1.1
3	0430	0.0	1136	1.3	1754	0.6	2213	0.9
4	0509	0.0	1221	1.6	1909	0.6	2315	0.8
5	0549	-0.1	1303	1.7	2009	0.5	---	---
6	0018	0.7	0629	-0.1	1345	1.9	2100	0.3
7	0113	0.7	0711	-0.2	1423	2.1	2147	0.2
8	0205	0.7	0753	-0.2	1506	2.2	2225	0.1
9	0255	0.7	0835	-0.2	1545	2.2	2304	0.1
10	0345	0.7	0924	-0.2	1627	2.2	---	---
11	2350	0.0*	0438	0.7	1011	-0.1	1710	2.1
12	0030	0.0	0537	0.4	1105	0.1	1752	1.9
13	0114	0.0	0645	0.9	1202	0.3	1837	1.7
14	0159	0.0	0755	1.0	1314	0.5	1924	1.6
15	0244	0.0	0914	1.2	1446	0.6	2015	1.3
16	0332	0.0	1030	1.4	1638	0.6	2117	1.1
17	0420	0.0	1136	1.6	1821	0.6	2226	0.4
18	0507	0.0	1228	1.7	1941	0.6	---	---
19	2336	0.8*	0554	-0.1	1313	1.8	2036	0.4
20	0038	0.7	0636	-0.1	1355	1.9	2118	0.4
21	0130	0.7	0719	-0.1	1432	2.0	2154	0.3
22	0217	0.7	0754	0.0	1507	2.0	2229	0.3
23	0255	0.7	0833	0.0	1539	2.0	2257	0.2
24	0335	0.7	0908	0.0	1608	1.9	2326	0.2
25	0412	0.8	0943	0.1	1639	1.9	---	---
26	2354	0.2*	0453	0.8	1021	0.2	1704	1.8
27	0023	0.2	0537	0.9	1100	0.3	1740	1.7
28	0054	0.2	0630	0.9	1145	0.5	1812	1.6
29	0125	0.2	0726	1.0	1242	0.6	1844	1.4
30	0200	0.2	0832	1.1	1400	0.7	1926	1.2
31	0242	0.2	0943	1.3	1544	0.7	2014	1.0

* -- TIDE OCCURS ON PREVIOUS DATE.

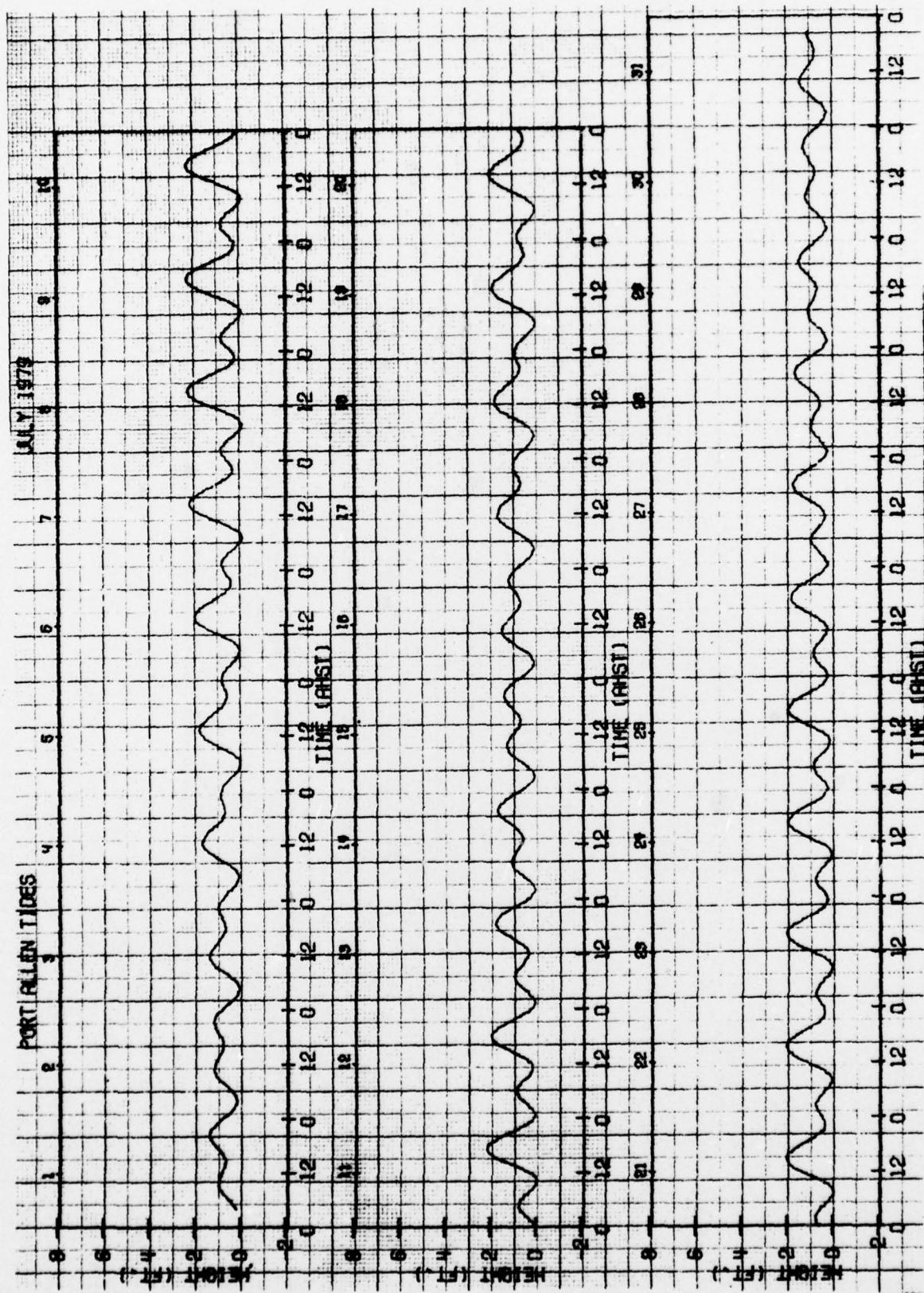


Figure 19. Tidal Graph for Port Allen, July 1979.

TABLE 36
PORT ALLEN TIDES
21 DEG 54 MIN N 159 DEG 35 MIN W - HANAPEPE BAY

AUGUST 1979

DATE	TIME AMST	HGT FT	TIME AMST	HGT FT	TIME AMST	HGT FT	TIME AMST	HGT FT
1	0328	0.2	1047	1.5	1738	0.7	2130	0.9
2	0419	0.1	1143	1.7	1858	0.6	2248	0.8
3	0511	0.1	1234	1.8	1954	0.5	----	---
4	2359	0.8*	0604	0.0	1318	2.0	2036	0.4
5	0100	0.8	0653	-0.1	1402	2.2	2118	0.2
6	0154	0.8	0742	-0.1	1444	2.2	2153	0.1
7	0245	0.9	0834	-0.1	1525	2.2	2232	0.1
8	0335	1.0	0922	-0.1	1606	2.2	2310	0.0
9	0426	1.1	1011	0.0	1645	2.0	----	---
10	2346	0.0*	0518	1.2	1107	0.2	1726	1.8
11	0025	0.0	0617	1.3	1206	0.4	1808	1.7
12	0106	0.1	0723	1.4	1318	0.6	1854	1.4
13	0149	0.1	0834	1.5	1450	0.6	1946	1.1
14	0237	0.1	0951	1.6	1642	0.7	2052	0.9
15	0332	0.2	1101	1.7	1823	0.6	2214	0.8
16	0429	0.2	1158	1.7	1929	0.6	----	---
17	2334	0.7*	0528	0.2	1249	1.8	2014	0.5
18	0034	0.8	0618	0.2	1332	1.9	2051	0.4
19	0124	0.8	0706	0.1	1407	1.9	2120	0.4
20	0206	0.9	0748	0.1	1441	1.9	2146	0.3
21	0243	1.0	0823	0.2	1511	1.9	2211	0.3
22	0316	1.0	0902	0.2	1540	1.8	2236	0.3
23	0351	1.1	0938	0.2	1608	1.8	2300	0.3
24	0427	1.2	1016	0.3	1633	1.7	2323	0.3
25	0506	1.2	1052	0.4	1702	1.6	----	---
26	2350	0.3*	0548	1.3	1140	0.5	1734	1.4
27	0019	0.3	0637	1.3	1238	0.6	1806	1.3
28	0054	0.3	0736	1.4	1354	0.7	1847	1.1
29	0133	0.3	0845	1.5	1540	0.7	1946	0.9
30	0226	0.3	0957	1.6	1723	0.6	2115	0.8
31	0330	0.3	1104	1.7	1836	0.6	2245	0.8

* -- TIME OCCURS ON PREVIOUS DATE.

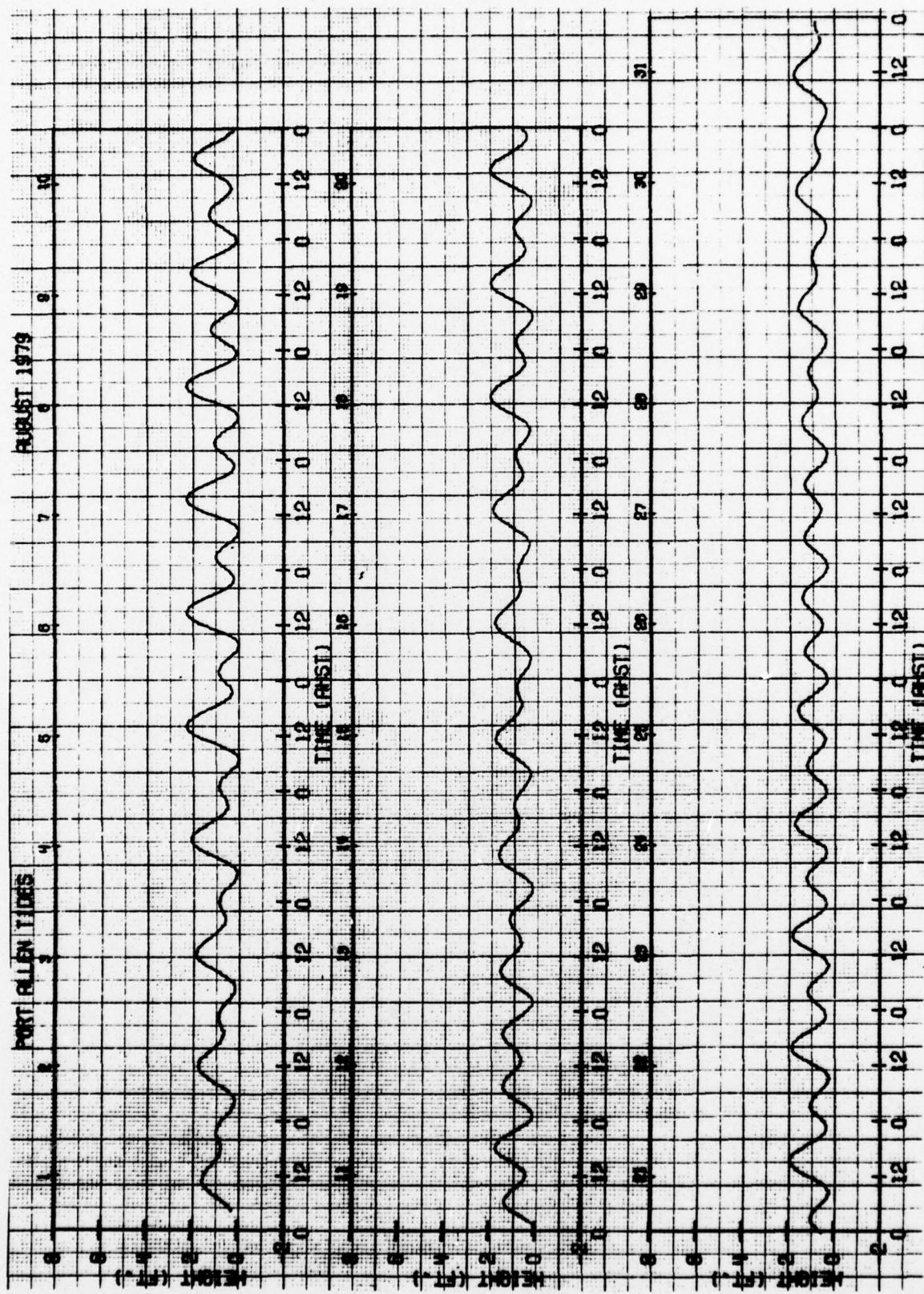


Figure 20. Tidal Graph for Port Allen, August 1979.

TABLE 37

POINT ALLEN TIDES
21 DEG 54 MIN N 159 DEG 35 MIN W - HANAPEPE BAY

SEPTEMBER 1979

DATE	TIME AMST	HGT FT	TIME AMST	HGT FT	TIME AMST	HGT FT	TIME AMST	HGT FT
1	0439	0.2	1159	1.9	1924	0.4	----	---
2	2359	0.8*	0545	0.2	1252	2.0	2003	0.3
3	0054	1.0	0646	0.1	1337	2.1	2041	0.2
4	0147	1.1	0739	0.0	1419	2.1	2114	0.1
5	0235	1.3	0832	0.0	1459	2.1	2149	0.1
6	0321	1.4	0924	0.1	1540	1.9	2223	0.1
7	0410	1.5	1016	0.2	1622	1.8	2254	0.1
8	0456	1.6	1110	0.3	1701	1.6	2334	0.1
9	0548	1.7	1211	0.4	1740	1.4	----	---
10	0010	0.2	0646	1.7	1323	0.6	1825	1.1
11	0051	0.2	0749	1.7	1454	0.6	1920	0.9
12	0139	0.3	0902	1.7	1638	0.6	2040	0.8
13	0238	0.4	1014	1.7	1801	0.6	2217	0.8
14	0354	0.4	1120	1.7	1856	0.5	----	---
15	2338	0.8*	0506	0.4	1213	1.8	1935	0.4
16	0033	0.9	0605	0.4	1255	1.8	2006	0.4
17	0114	1.0	0654	0.3	1334	1.8	2032	0.3
18	0154	1.1	0740	0.3	1406	1.8	2054	0.3
19	0225	1.3	0820	0.3	1434	1.7	2119	0.3
20	0258	1.4	0857	0.3	1506	1.7	2141	0.3
21	0330	1.4	0935	0.3	1531	1.6	2204	0.3
22	0401	1.5	1015	0.4	1603	1.5	2226	0.3
23	0437	1.6	1057	0.5	1628	1.4	2248	0.3
24	0514	1.6	1147	0.5	1701	1.2	2319	0.3
25	0601	1.7	1246	0.6	1739	1.0	----	---
26	2352	0.3*	0653	1.7	1402	0.6	1824	0.9
27	0033	0.4	0757	1.7	1535	0.6	1940	0.8
28	0133	0.4	0911	1.7	1705	0.6	2124	0.7
29	0251	0.4	1021	1.7	1802	0.4	2257	0.8
30	0420	0.4	1122	1.8	1846	0.3	----	---

* -- TIDE OCCURS ON PREVIOUS DATE.

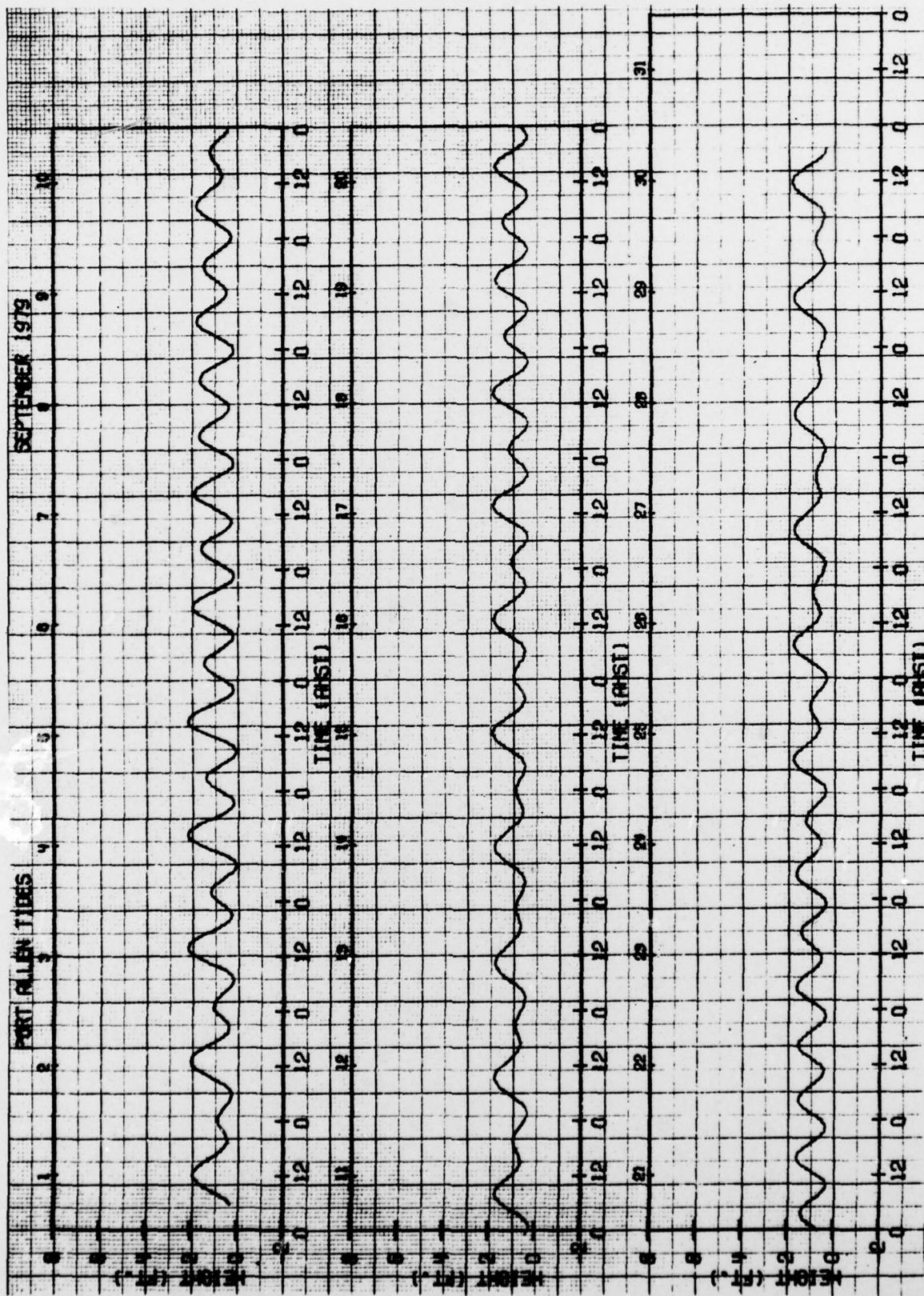


Figure 21. Tidal Graph for Port Allen, September 1979.

TABLE 38
PORT ALLEN TIDES
OCTOBER 1979
21 DEG 54 MIN N. 159 DEG 35 MIN W - MANAMEPE RAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0003	1.0	0536	0.4	1217	1.9	1924	0.2
2	0053	1.2	0642	0.3	1305	1.9	1959	0.1
3	0142	1.4	0740	0.2	1350	1.8	2033	0.0
4	0227	1.6	0834	0.2	1432	1.7	2105	0.0
5	0308	1.7	0928	0.2	1514	1.7	2137	0.0
6	0354	1.8	1023	0.2	1553	1.5	2210	0.0
7	0436	1.9	1116	0.3	1632	1.3	2242	0.1
8	0522	1.9	1217	0.4	1714	1.1	2316	0.2
9	0611	1.9	1324	0.5	1801	0.9	----	---
10	2353	0.3*	0707	1.8	1450	0.6	1905	0.7
11	0036	0.4	0811	1.7	1611	0.5	2034	0.7
12	0138	0.5	0919	1.7	1721	0.5	2219	0.7
13	0304	0.6	1025	1.7	1810	0.4	----	---
14	2331	0.9*	0434	0.6	1120	1.7	1844	0.3
15	0021	1.0	0546	0.6	1209	1.7	1911	0.3
16	0100	1.2	0642	0.5	1251	1.6	1939	0.2
17	0135	1.3	0731	0.5	1323	1.6	2002	0.2
18	0206	1.5	0815	0.4	1355	1.5	2026	0.2
19	0238	1.6	0857	0.4	1427	1.4	2049	0.1
20	0310	1.7	0938	0.4	1459	1.3	2112	0.1
21	0342	1.7	1020	0.4	1531	1.2	2136	0.1
22	0415	1.8	1107	0.4	1603	1.1	2202	0.1
23	0453	1.8	1158	0.5	1638	0.9	2231	0.2
24	0535	1.9	1254	0.5	1721	0.8	2305	0.2
25	0624	1.8	1404	0.5	1822	0.7	----	---
26	2350	0.3*	0723	1.8	1520	0.4	1950	0.7
27	0053	0.4	0829	1.8	1629	0.4	2137	0.7
28	0222	0.5	0936	1.7	1718	0.3	2300	0.2
29	0402	0.6	1041	1.7	1803	0.1	----	---
30	2359	1.1*	0530	0.5	1140	1.7	1842	0.0
31	0047	1.4	0641	0.4	1233	1.6	1916	0.0

* -- TIDE OCCURS ON PREVIOUS DATE.

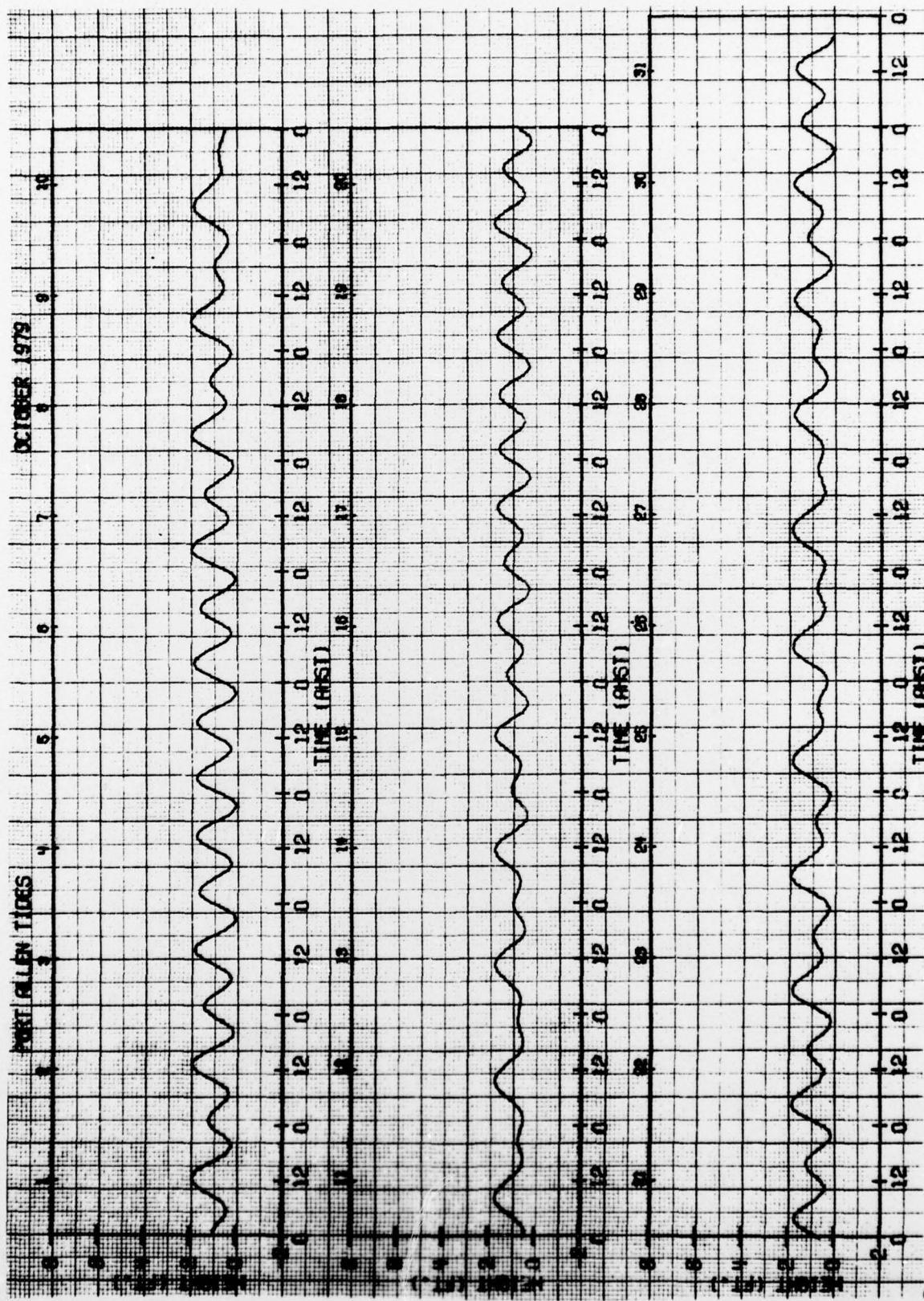


Figure 22. Tidal Graph for Port Allen, October 1979.

TABLE 39
PORT ALLEN TIDES
21 DEG 54 MIN N. 159 DEG 35 MIN W - HANAPEPE HAY
NOVEMBER 1979

DATE	TIME AMST	HGT FT	TIME AMST	HGT FT	TIME AMST	HGT FT	TIME AMST	HGT FT
1	0133	1.6	0745	0.4	1319	1.5	1951	-0.1
2	0215	1.8	0843	0.3	1404	1.4	2024	-0.1
3	0257	1.9	0938	0.3	1445	1.2	2056	-0.1
4.	0339	2.0	1031	0.3	1527	1.1	2126	-0.1
5	0418	2.1	1124	0.3	1610	0.9	2158	0.0
6	0500	2.1	1223	0.3	1652	0.8	2229	0.1
7	0545	2.0	1322	0.4	1742	0.7	2305	0.2
8	0630	1.9	1424	0.4	1846	0.6	----	---
9	2347	0.4*	0722	1.7	1530	0.4	2019	0.6
10	0042	0.5	0816	1.7	1622	0.3	2158	0.1
11	0205	0.6	0917	1.6	1709	0.3	2310	0.4
12	0341	0.6	1014	1.5	1746	0.2	----	---
13	2359	1.1*	0514	0.6	1107	1.4	1816	0.2
14	0038	1.3	0623	0.6	1152	1.3	1845	0.1
15	0113	1.5	0722	0.6	1237	1.3	1912	0.1
16	0145	1.6	0811	0.5	1316	1.2	1937	0.0
17	0217	1.7	0859	0.4	1351	1.1	2002	0.0
18	0249	1.8	0940	0.4	1430	1.0	2030	0.0
19	0324	1.9	1025	0.3	1502	0.9	2100	0.0
20	0359	2.0	1112	0.3	1541	0.8	2129	0.0
21	0437	2.1	1201	0.3	1626	0.7	2204	0.0
22	0518	2.0	1253	0.3	1716	0.6	2243	0.1
23	0604	2.0	1348	0.3	1824	0.6	2329	0.2
24	0654	1.9	1447	0.2	1952	0.6	----	---
25	0034	0.4	0751	1.7	1543	0.1	2129	0.4
26	0203	0.6	0853	1.7	1632	0.1	2248	1.0
27	0350	0.6	0955	1.5	1719	0.0	----	---
28	2347	1.3*	0530	0.6	1058	1.4	1759	-0.1
29	0039	1.6	0650	0.5	1157	1.2	1836	-0.2
30	0124	1.7	0759	0.4	1252	1.1	1913	-0.2

* -- TIDE OCCURS ON PREVIOUS DATE.

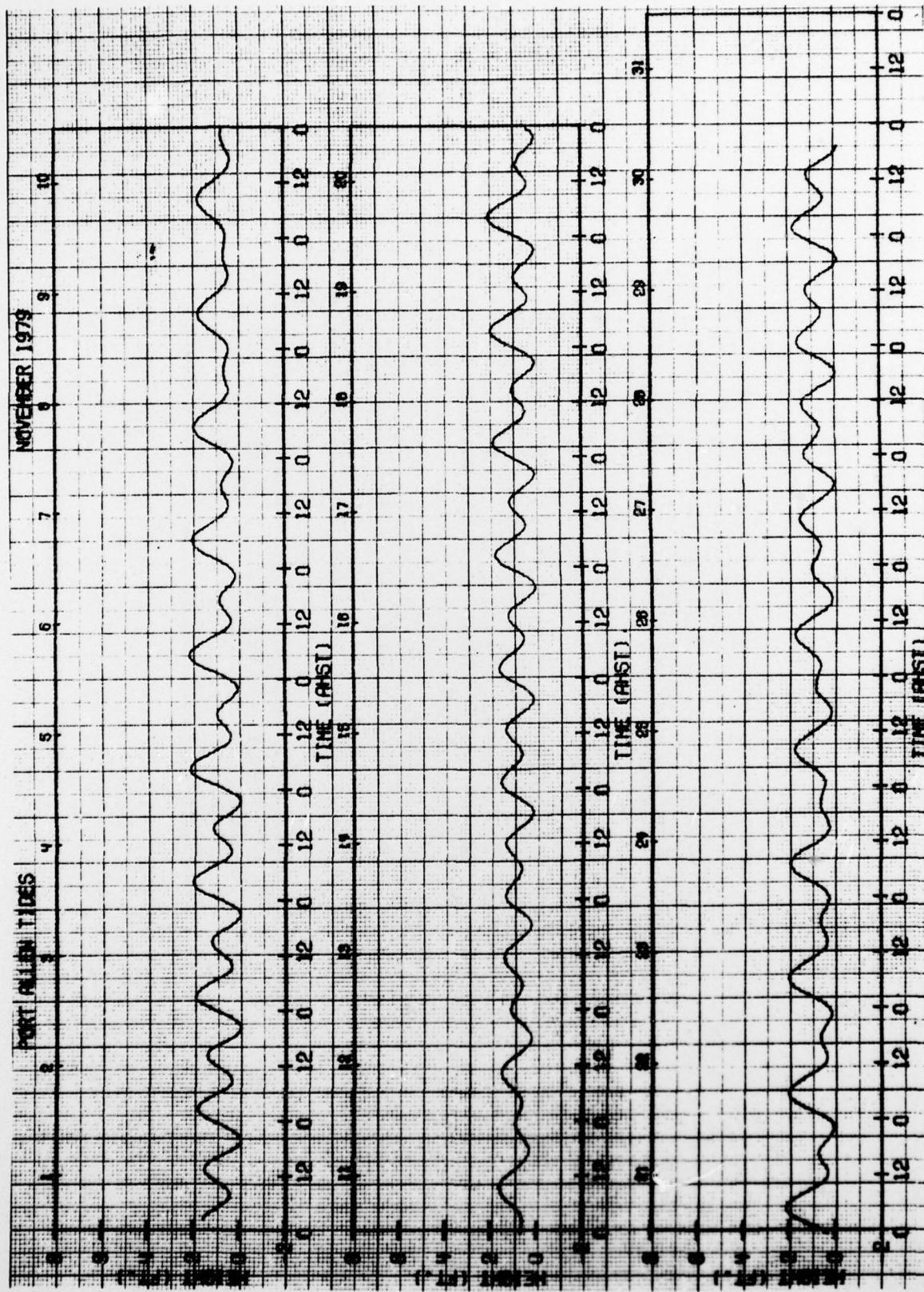


Figure 23. Tidal Graph for Port Allen, November 1979.

TABLE 40
PORT ALLEN TIDES
21 DEG 54 MIN N 159 DEG 35 MIN W - MANAPEPE BAY
DECEMBER 1979

DATE	TIME AMST	MGT FT	TIME AMST	MGT FT	TIME AMST	MGT FT	TIME AMST	MGT FT
1	0205	1.9	0856	0.3	1338	1.0	1946	-0.2
2	0244	2.1	0948	0.3	1425	0.8	2021	-0.2
3	0324	2.1	1039	0.2	1509	0.7	2054	-0.1
4	0402	2.1	1125	0.2	1551	0.7	2126	-0.1
5	0439	2.1	1211	0.2	1634	0.6	2201	0.0
6	0518	2.0	1256	0.2	1724	0.6	2236	0.1
7	0557	1.9	1346	0.2	1822	0.6	2314	0.3
8	0638	1.7	1430	0.2	1935	0.6	---	---
9	0003	0.4	0720	1.7	1516	0.2	2102	0.7
10	0112	0.6	0804	1.5	1558	0.2	2228	0.8
11	0245	0.6	0901	1.4	1640	0.1	---	---
12	2323	1.1*	0435	0.7	0957	1.2	1714	0.1
13	0007	1.3	0604	0.6	1053	1.1	1749	0.0
14	0044	1.5	0712	0.6	1146	1.0	1820	0.0
15	0121	1.7	0811	0.5	1237	0.9	1855	-0.1
16	0157	1.8	0857	0.4	1322	0.8	1924	-0.1
17	0230	1.9	0939	0.3	1404	0.7	1959	-0.2
18	0305	2.1	1024	0.2	1446	0.7	2034	-0.2
19	0343	2.1	1105	0.2	1531	0.7	2110	-0.2
20	0423	2.2	1147	0.1	1620	0.6	2152	-0.1
21	0502	2.1	1231	0.1	1714	0.6	2237	0.0
22	0545	2.0	1319	0.1	1817	0.7	2329	0.2
23	0627	1.8	1405	0.0	1934	0.7	---	---
24	0032	0.4	0718	1.7	1454	0.0	2059	0.4
25	0158	0.6	0811	1.5	1544	-0.1	2222	1.1
26	0348	0.6	0913	1.3	1632	-0.1	---	---
27	2328	1.4*	0538	0.6	1022	1.1	1717	-0.1
28	0023	1.6	0706	0.5	1128	0.9	1800	-0.2
29	0109	1.8	0814	0.4	1230	0.8	1842	-0.2
30	0154	1.9	0907	0.3	1322	0.7	1919	-0.2
31	0233	2.0	0951	0.2	1412	0.6	1959	-0.2

* -- TIDE OCCURS ON PREVIOUS DATE.

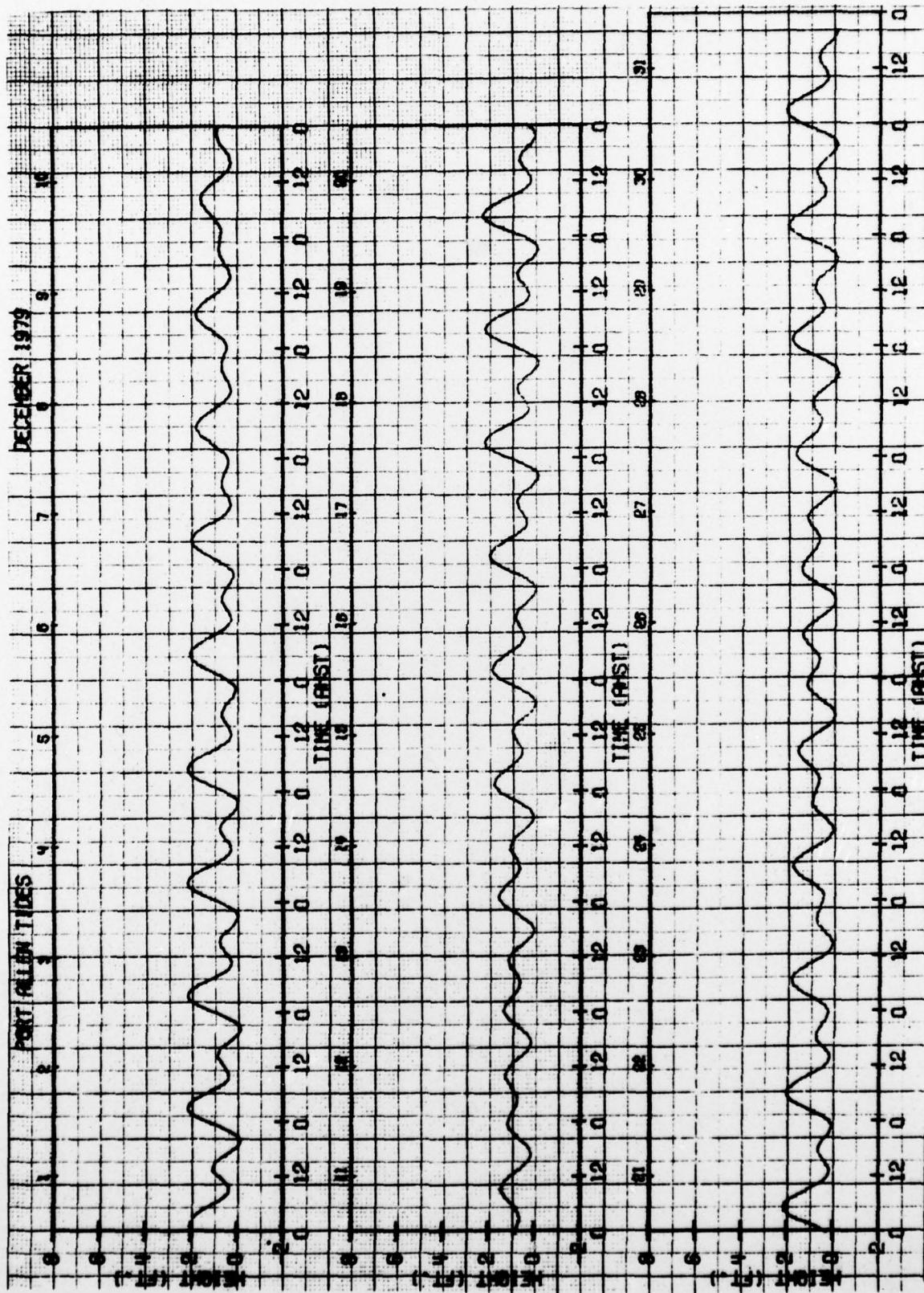


Figure 24. Tidal Graph for Port Allen, December 1979.

APPENDIX

EQUINOXES, SOLSTICES, AND LUNAR PHASES DURING 1979

The dates and times for Vernal and Autumnal Equinoxes and Summer and Winter Solstices during 1979 are listed in table 41. The 1979 dates and times for phases of the moon are given in table 42. Both tables have been calculated for Point Mugu and San Nicolas Island. Two hours must be subtracted for times in the Barking Sands area.

Table 41. Equinoxes and Solstices, 1979, Point Mugu and San Nicolas Island

NOTE: All times are Pacific Standard Time; add 1 hour when Daylight Savings Time (PDT) is in effect. Subtract 2 hours for Barking Sands area.

Vernal Equinox	20 March, 2122 PST	Beginning of Spring; day and night of equal length.
Summer Solstice	21 June, 1556 PST	Beginning of Summer; greatest duration of daylight.
Autumnal Equinox	23 September, 0717 PST	Beginning of Autumn; day and night of equal length.
Winter Solstice	22 December, 0310 PST	Beginning of Winter; greatest duration of darkness.

Table 42. Lunar Phases, 1979, Point Mugu and San Nicolas Island

NOTE: All times are Pacific Standard Time; add 1 hour when Daylight Savings Time (PDT) is in effect. Subtract 2 hours for times in the Barking Sands area.

Phase	January		February		March		April	
	Date	Time	Date	Time	Date	Time	Date	Time
First Quarter	05	0315	03	1636	05	0823	04	0157
Full Moon	12	1509	11	1839	13	1314	12	0515
Last Quarter	21	0323	19	1717	21	0322	19	1030
New Moon	27	2220	26	0845	27	1859	26	0615
Phase	May		June		July		August	
	Date	Time	Date	Time	Date	Time	Date	Time
First Quarter	03	2025	02	1437	02	0724	---	---
Full Moon	11	1801	10	0355	09	1154	07	1421
Last Quarter	18	1557	16	2101	16	0259	14	1102
New Moon	25	1600	24	0358	23	1741	22	0910
First Quarter	---	---	---	---	31	2157	30	1009
Phase	September		October		November		December	
	Date	Time	Date	Time	Date	Time	Date	Time
Full Moon	06	0239	05	1135	03	2147	03	1008
Last Quarter	12	2215	12	1324	11	0824	11	0559
New Moon	21	0147	20	1823	19	1104	19	0023
First Quarter	28	2020	28	0506	26	1309	25	2111

Because the earth's period of revolution about the sun (365.24+ days) is not evenly divisible by the moon's period of revolution about the earth (27.32+ days), the dates and times of lunar phases, moonrise and moonset, and tidal data must be recomputed for each year. The following information, however, is based on geometrical relationships and holds true for all times:

1. The New Moon rises at sunrise, crosses the meridian at noon, and sets at sunset.
2. The First Quarter Moon rises at noon, crosses the meridian at sunset, and sets at midnight.
3. The Full Moon rises at sunset, crosses the meridian at midnight, and sets at sunrise.
4. The Last Quarter Moon rises at midnight, crosses the meridian at sunrise, and sets at noon.

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